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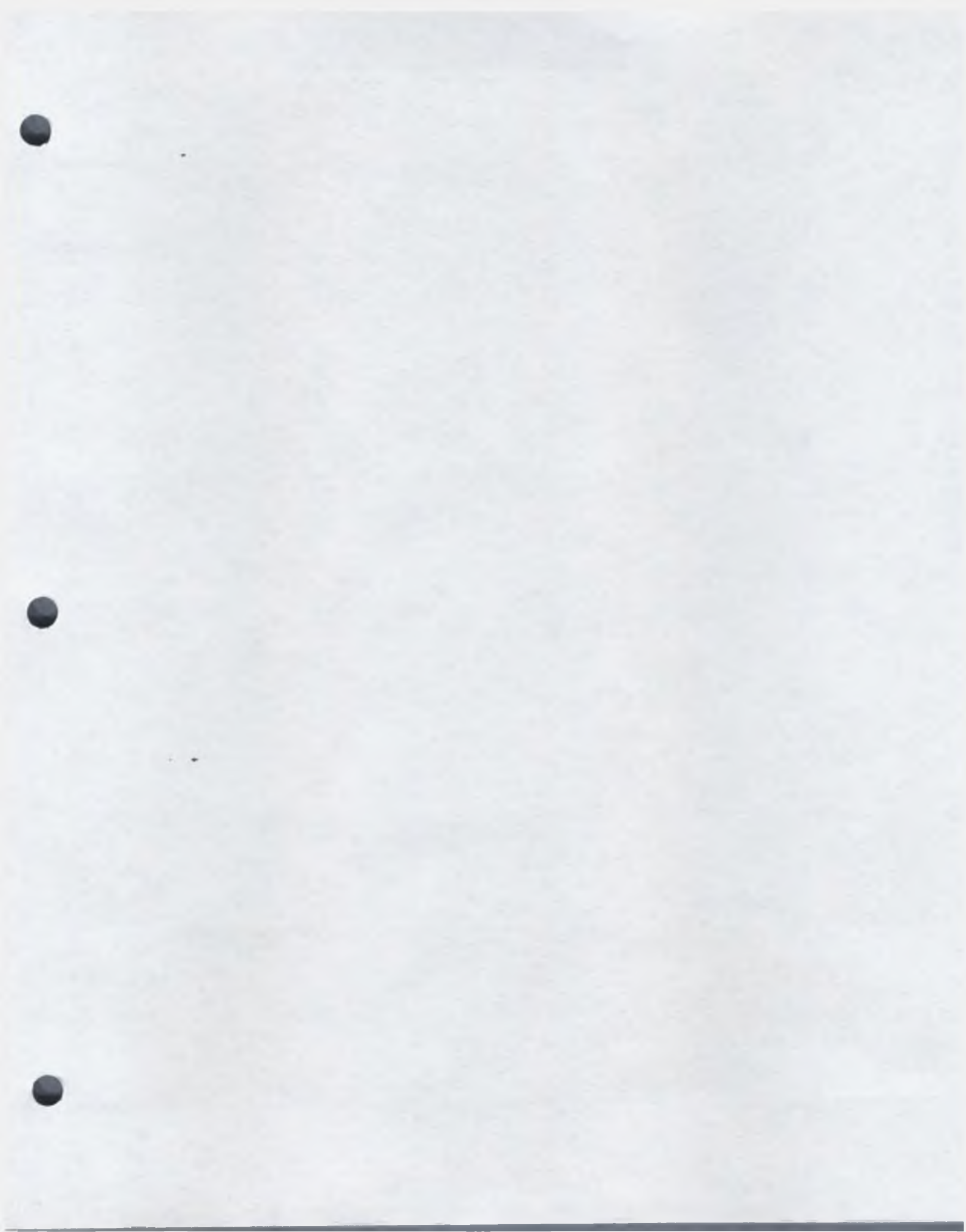
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INVENTORY OF ATLANTIC WHITE-CEDAR REMNANT STANDS

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Table 3. Remnant Atlantic white-cedar soil type occurrence.

<u>Soil Type</u>	<u>No. of Occurrences</u>
Pungo muck	33
Dorovan muck	21
Johnston loam	17
Torhunta & Lynn Haven	15
Johnston mucky loam	13
Dorovan mucky peat	7
Bibb sandy loam	7
Muckalee loam	5
Pamlico muck	5
Roper muck	5
Rains loamy sand	4
Croatan muck	4
Dare muck	3
Leon & Tomahawk	3
Belhaven muck	3
Goldsboro loamy sand	2
Hyde loam	2
Woodington loamy sand	2
Ponzer muck	2
Candor & Wakulla	2
Rains sandy loam	2
Scuppernong muck	2
Woodington fine sandy loam	2
Ballahack loam	1
Dorovan & Johnston	1
Gilead	1
Marvyn loamy sand	1
Pantego loam	1
Paxville fine sandy loam	1
Portsmouth loam	1
Rutlege	1
Tomotley fine sandy loam	1
Torhunta fine sandy loam	1
Torhunta loam	1
Vaocluse gravelly sandy loam	1
Wehadkee fine sandy loam	1

INTRODUCTION

Chamaecyparis thyoides (L.) B.S.P., commonly known as Atlantic white-cedar (AWC), is an evergreen conifer that grows along the Atlantic and Gulf Coasts from Maine to Mississippi (Little 1959) most often on deep organic soils or sandy soils with stable hydrology (Korstian 1924). Historically, pure AWC forests, also known as glades, occurred in landscapes that experienced catastrophic fire on intervals of 25-300 years (Frost 1987). In these environments, the best conditions for AWC regeneration result from fires that create open sites but do not destroy the upper 2 to 4 inches of peat where viable seed exists (Laderman 1987).

The distribution of AWC in North Carolina has decreased greatly since the mid 1800s when steam technology enabled logging, land clearing, and associated drainage operations to permeate the formerly vast swamplands of the coastal plain (Frost 1987, Research Triangle Institute 1982). The current coverage of AWC has been mapped for areas that formerly contained the greatest AWC acreages, however, this is the first known attempt to identify and quantify the location and condition of mature remnant stands throughout the state for use by those interested in natural area management, wetlands restoration, genetic conservation, and timber production.

In North Carolina, AWC most often occurs in pocosins, Carolina bays, floodplains, and in stream valleys that have organic deposits (Lilly, unpubl., Schafale and Weakley 1990). Depending on fire frequency, soil type, latitude, altitude, hydrologic disturbances, and logging, AWC grows in pure stands or as a codominant in mixed stands with red maple, swamp black gum, baldcypress, loblolly pine, pond pine, tuliptree, sweet bay, loblolly bay, and red bay (Laderman 1989). The shrub layer is open to very dense and typically includes members of the Heath family (Ericaceae) such as fetterbush, inkberry, sweet gallberry, sweet pepperbush, highbush blueberry, and poison ivy (Laderman 1989). The herb layer varies with canopy and moisture conditions and often includes sedges, royal fern, cinnamon fern, and peatmosses.

Also known as juniper, boat juniper, white-cedar, false cypress, swamp-cedar, and southern white-cedar, the wood of AWC has been highly valued because it is durable, resists decay, handles easily, and is strong and light. It's chief historical uses have been for boat planking, decks and cabins, boxes, crates, fencing, shakes and shingles, telegraph and telephone poles, interior paneling, and exterior siding. Today it is still highly valued for boat building, shingles, and siding (Summerville and others, unpubl.).

Heavy cutting, hydrologic disruptions, and swampland development compounded by poor natural regeneration have greatly reduced the distribution of AWC to a fraction of it's pre-industrial coverage. Until 1750, human disturbance of AWC was probably limited to hand felling (Frost 1987). During the next 100 years, logging along waterways and hand-dug drainage ditches accelerated the subsidence of organic deposits and exacerbated the hydrological alterations that led to increasingly poor regeneration following cutting and land clearing.

With the advent of steam technology in the 1850s, logging and drainage operations began their reach into the interior of North Carolina's swamp forests. Using steam dredges and railroads, approximately 50% of the state's AWC acreage was cut by 1890 (Frost 1987). The most concentrated timbering took place in the Great Dismal Swamp where between 65,000 and 110,000 acres were cut. In addition to accessing the timber resources, thousands of acres of swamp forest in the Great Dismal Swamp, East Dismal Swamp, and on the Albemarle-Pamlico peninsula were drained and cleared for rice cultivation and malaria prevention during the same period (Sharitz and Gibbons 1982). In these areas, the nutrient poor and woody organic soils proved less than desirable for agriculture and the land use focus returned to wood harvest by the late 1800s (Lilly 1981). Shortly after, Ashe (1894) estimated the remaining coverage of AWC in North Carolina to be around 200,000 acres. At that time the greatest acreages of AWC remained on the Albemarle-Pamlico peninsula in Hyde, Tyrrell, and Dare counties (Moore and Laderman 1989).

Although many of the forests that were logged or cleared regenerated, the abundance of AWC was less than it had been in the virgin stands (Frost 1987). Nevertheless, adequate stocking in the second and third growth forests existed to support extensive timber harvest operations in the Great Dismal Swamp, Albemarle-Pamlico swamps, and the Green Swamp well into the twentieth century (Ash and McDonald 1983). Meanwhile, the combined effect of continued logging road construction, land clearing, government subsidized drainage, and altered fire regimes led to an ever-decreasing acreage of AWC.

Today, experts estimate the remaining AWC acreage at 1-10% of its original coverage. Because of this marked decline, The Nature Conservancy considers the AWC community as "globally endangered" (Smith 1994).

In recent years, the estimated overall coverage of AWC in North Carolina has varied. Radford and others (1968) reported it to occur in 20 counties; Little (1971) reported it in 45 counties. This inventory reports it to occur in 31 counties. Sheffield and others (1990) using U.S. Department of Agriculture permanent forest inventory plot data estimated AWC (5+ inch dbh) to occur on 190,000 acres in North Carolina. This figure is substantially greater than the total remnant (6+ inch dbh) acreage of 10,583 reported in this inventory. Although the authors of this report acknowledge that the acreage of AWC in several remote areas remains uncertain, they believe the majority of pure and mixed stands were identified.

Currently, the greatest remaining acreage of AWC occurs on the Albemarle-Pamlico Peninsula, although it is a small fraction of what existed a century ago. Based on the data collected for this inventory, approximately 8500 acres of mature pure, mixed, and widely scattered AWC are present in Dare, Tyrrell, Washington, and Hyde counties combined. This represents 80% of the known remnant acreage in North Carolina. Within the boundaries of the peninsula, the single greatest occurrence is on the Dare county mainland where nearly 6000 acres of mature AWC grow in the interconnected peatland mosaic of the Alligator River National Wildlife Refuge (NWR) and U.S. Air Force Dare County Range (DCR).

Second in overall coverage is the fragmented remains of the Great Dismal Swamp, at one time the greatest single acreage in North Carolina. Here, AWC occurs in pure and mixed stands on approximately 450 acres of the North Carolina portion of the Great Dismal Swamp NWR (approximately 25,000 acres) and on the 14,500 acre Dismal Swamp State Natural Area (SNA). Both sites were acquired in the mid 1970s after the majority of the merchantable AWC had been logged. According to Brownlie (unpubl.), during the past twenty years, much of the formerly pure remnant acreage has become mixed as pockets created by windthrown 65+ year old AWC have regenerated in red maple and swamp black gum.

The third most abundant distribution of AWC occurs in the vestigial portion of the Green Swamp in Brunswick County. Here, approximately 250 known acres of AWC occurs in mixed stands and as residuals around recent clearcuts. Included is a 58 acre stand of young-mature AWC on the 13,850 acre Green Swamp Preserve. Prior to 1861, the Green Swamp contained 90,000 acres of swamp forest dominated by baldcypress and swamp black gum with AWC and pine as codominants. Following an intensive logging period that lasted from the early 1860s until 1940, the residual slash and brush were burned repeatedly and much of the swamp regenerated in fire tolerant pocosin species such as titi and pond pine. Today, most of the swamp is managed as pine plantations by private timber companies (Kologiski 1977).

A fourth notable AWC area of interest is in the Sandhills landscape region where 194.5 known acres of mature remnant groves and stands grow along drainages and adjacent upslopes. The stands within the 48 sites are scattered and relatively small (2-30 acres) compared with those found in the outer coastal plain (20-300 acres). Nevertheless, their ecological value as stores of allelic richness should not be overlooked.

The fifth major concentration of AWC occurs in Bladen County where 8 known sites containing 50 acres of mostly pure AWC grow mainly in and around Carolina bays in the Jones and Salters Lakes vicinities. The remaining known AWC acreage is found in scattered stands near swamps, rivers, and drainages in the middle and outer coastal plain.

EXECUTIVE SUMMARY

The ecology, uses, and historical distribution of AWC in North Carolina have been documented by many authors. Lacking has been a statewide effort to map and quantify the locations and conditions of extant remnant stands. This inventory was commissioned by the U.S. Air Force to fulfill this research need. The specific purposes of the inventory are twofold; first, to identify the location and condition of remnant AWC groves (areas less than 2 acres) and stands (areas 2 acres or greater) in North Carolina, and second, to compare those sites with remnant AWC sites on the DCR. By examining such data and comparisons, DCR officials will be able to view their forest management from a statewide perspective. The authors expect the report will also be used by other agencies, foresters, and ecologists interested in the perpetuation of AWC and its associated natural communities.

Within this inventory, AWC refers to the species *Chamaecyparis thyoides*. The standard spelling assumed is Atlantic white-cedar. Where written otherwise, such as in the Natural Community type labels, the authors use the spellings as they appear within the referenced text.

This inventory is a comprehensive description of a statewide resource rather than a standard forest inventory that focuses on volumes and stocking. Therefore, for each site, the authors described dominant vegetation along with other ecological characteristics such as understory and herb layers, soils, past disturbances, and natural community types. It should be clearly noted that the authors do not claim this inventory to be exhaustive, however, it is extremely representative.

The inventory describes known sites that contain AWC with diameters 6 inches or greater. Although young regenerating sites were not inventoried, their locations and approximate sizes are noted if they occur adjacent to or within remnant groves and stands. Plantations were excluded. AWC sites are described as pure if AWC comprises 50% or more of the stand basal area, mixed if AWC comprises 10-49% of the stand basal area, or widely scattered if AWC comprises less than 10% of the stand basal area. Based on these descriptions, 54% of the AWC identified for the state occurs in pure stands, 14.5% in mixed stands, and 27.5% in widely scattered stands (Table 1). An additional 4% of the sites are of unknown or uncertain composition.

Sites are cataloged according to the *Classification of the Natural Communities of North Carolina, Third Approximation* (Schafale and Weakley, 1990) into the seven natural community 44types in which AWC typically occurs (Table 2 and Figure 1). In descending order they are Peatland Atlantic White Cedar (61.4% occurrence), Nonriverine Swamp Forest (30.2%), Pond Pine Woodland (5.8%), Streamhead Atlantic White Cedar (1.3%), Bay Forest (0.7%), Coastal Plain Bottomland Hardwoods (0.5%), and Streamhead Pocosin (0.03%). Many sites are transitional and therefore have more than one type listed. Type variants were not identified.

Thirty-six soil types occur within the known AWC sites (Table 3). The most common include Pungo and Dorovan mucks, Johnston loam, and the Torhunta & Lynn Haven association.

The statewide occurrence of AWC was divided into seven landscape regions (Table 4). In descending order of AWC acreage, they are the Northern Outer Coastal Plain (92.8% of total AWC acreage), Southern Outer Coastal Plain (2.7%), Sandhills (1.8%), Northern Inner Coastal Plain (1.5%), Middle Outer Coastal Plain (0.5%), Bladen Lakes (0.5%), and Middle Inner Coastal Plain (0.2%).

A total of 153 AWC sites are described for 31 counties in which AWC is found (Table 5). Together they contain 10,583 acres of pure, mixed, or widely scattered AWC in 371 groves and stands. The five counties with the greatest AWC acreage include Dare (56.5% of the total AWC acreage), Tyrrell (13%), Camden (8%), Hyde (7%), and Washington (3.5%), all in the Northern Outer Coastal Plain. The five counties with the greatest number of AWC sites are Dare (19 sites), Hoke (17), Cumberland (13), Tyrrell (11), and Bladen (9). Those with the greatest number of stands and groves are Tyrrell (78), Dare (64), Hyde (33), Camden (24), and Hoke (17).

Of the 10,583 acres identified, 77% are publicly owned and 23% are privately owned (Table 6 and Figure 2). The public ownership includes the U.S. Departments of Interior, Defense, and Agriculture, and the State of North Carolina (Table 7). Interior holdings comprise 48.5% of the total statewide acreage and include Alligator River NWR with 39.2%, Pocosin Lakes NWR, and Great Dismal Swamp NWR. Defense holdings comprise 22.2% of the total and include the DCR with 21.2%, Ft. Bragg Military Reservation, Camp LeJeune Marine Corps Base, and Camp Mackall Military Reservation. State of North Carolina holdings comprise 6.5% and include North River, Sandhills, and Holly Shelter Game Lands, Dismal Swamp SNA, Jones Lake State Park, Bladen Lakes State Forest, and land administered by North Carolina State University and the N.C. Department of Administration. A single U.S. Department of Agriculture holding is present on the Croatan National Forest.

The largest AWC acreage holder in North Carolina is the Alligator River NWR with 4152 acres of pure, mixed, and widely scattered AWC, of which 3734 acres are in Dare County and 418 acres are in Hyde County. The Refuge AWC acreage is divided into 7 sites containing 37 stands, therefore many of the sites are described as stand clusters. Refuge AWC sites are categorized as 1837 acres pure (32% of the statewide total), 365 acres mixed (24% of the total), and 1950 acres widely scattered (67.3% of the total).

With 2242 acres of pure, mixed, and widely scattered AWC, the DCR contains the second largest AWC acreage in North Carolina and represents 95% of all Department of Defense AWC holdings. The density of AWC within the 12 DCR sites and 27 stands is classified as 1231 acres pure (55% of the DCR total), 866 acres widely scattered (39%), and 145 acres mixed (6%). From a statewide perspective, the DCR contains 21.4% of the total pure acreage, 30% of the total widely scattered acreage, and 9.5% of the mixed acreage. Average pure stand tree diameters, heights, ages, and basal areas for the DCR are similar to statewide averages (Tables 8 and 9, and Figure 3). For mixed stands, the DCR measurements are approximately 9% greater than the statewide averages.

Table 1. Remnant Atlantic White-cedar Acreage by density.

<u>AWC Density</u>	<u>AWC Ac</u>	<u>% of Total</u>
Pure	5752	54
Mixed	1523	14.5
Widely Scattered	2897	27.5
Unknown	411	4

Table 2. Remnant Atlantic white-cedar acreage by natural community type.

<u>Natural Community Type</u>	<u>AWC Ac</u>	<u>% of Total</u>
Peatland Atlantic White Cedar	6496	61.4
Nonriverine Swamp Forest	3200	30.2
Pond Pine Woodland	613.5	5.8
Streamhead Atlantic White Cedar	135.5	1.3
Bay Forest	77	0.7
Coastal Plain Bottomland Hardwoods	56	0.5
Streamhead Pocosin	3.5	0.03
Disturbed	1.5	0.01

Table 4. Remnant Atlantic white-cedar acreage by landscape region.

<u>Landscape Region</u>	<u>AWC Ac</u>	<u>% of Total</u>
Northern Outer Coastal Plain	9823	92.8
Southern Outer Coastal Plain	288	2.7
Sandhills	194.5	1.8
Northern Inner Coastal Plain	150	1.5
Middle Outer Coastal Plain	57.5	0.5
Bladen Lakes	50	0.5
Middle Inner Coastal Plain	20	0.2

Table 5. Remnant Atlantic white-cedar acreage by county.

<u>County</u>	<u>Pure Ac</u>	<u>Mixed Ac</u>	<u>WS* Ac</u>	<u>Unk</u>	<u>Total</u>
Dare	2854	306	2816		5976
Tyrrell	1183	75		100	1358
Camden	551	98		178	827
Hyde	262	454			716
Washington	363		10		373
Currituck	312	40			352
Brunswick		228		25	253
Gates	51	100			151
Wayne		90			90
Cumberland	1	12.5	21	42	76.5
Hertford				60	60
Bladen	45	5.5			50.5
Hoke	32.5	11		0.5	44
Pasquotank		39			39
Moore	37	0.5			37.5
New Hanover	34				34
Jones			30		30
Chowan		19		0.5	19.5
Sampson	3	4	12.5		19.5
Lee	7	12			19
Onslow	0.5	17	0.5		18
Richmond	11				11
Craven			5.5	4	9.5
Beaufort		8			8
Scotland	5				5
Pamlico		3			3
Harnett	0.5		1		1.5
Pender				1	1
Johnston			0.5		0.5
Wilson		0.3			0.3
Columbus					Unk
TOTAL	5752	1523	2897	411	10,583

* WS: Widely Scattered

Table 6. Remnant Atlantic white-cedar acreage by ownership.

<u>Ownership Type</u>	<u>AWC Ac</u>	<u>% of Total</u>
Public	8181	77
Private	2402	23
TOTAL	10,583	

Table 7. Remnant Atlantic white-cedar acreage by public ownership.

<u>Public Agency</u>	<u>Management Unit</u>	<u>AWC Ac</u>	<u>Total AWC Ac</u>
Dept. of Interior			5137
	Alligator River NWR	4152	
	Pocosin Lakes NWR	614	
	Great Dismal Swamp NWR	371	
Dept. of Defense			2351
	Dare County Range	2242	
	Ft. Bragg	91	
	Camp LeJeune	18	
	Camp Mackall	Unk	
State of North Carolina			689
	North River Game Land	300	
	NC State University	235	
	Dismal Swamp SNA	130	
	Jones Lake State Park	11.5	
	Sandhills Game Land	10.5	
	Bladen Lakes State Forest	1	
	Holly Shelter Game Land	1	
	Dept. of Administration	Unk	
Dept. of Agriculture			4
	Croatan National Forest	4	
TOTAL			8181

Table 8. Dare County Range measurement averages.*

<u>AWC</u> <u>Dens.</u>	<u>dbh</u>	<u>ht</u>	<u>age</u>	<u>Stand</u> <u>BA</u>	<u>AWC</u> <u>BA</u>	<u>AWC</u> <u>%</u>
Pure	10.3 (10.6)	64 (61)	55 (46)	176 (182)	123 (138)	69 (74)
Mixed	11.0 (12.1)	60 (64)	60 (67)	183 (214)	53 (62)	30 (31)
Widely Scatt.	9 (9)	55 (55)	40 (40)	80 (80)	1 (1)	1 (1)

*Each cell contains an average based on the number of sites and an (average based on acreage).

Table 9. Statewide measurement averages.*

<u>AWC</u> <u>Dens.</u>	<u>dbh</u>	<u>ht</u>	<u>age</u>	<u>Stand</u> <u>BA</u>	<u>AWC</u> <u>BA</u>	<u>AWC</u> <u>%</u>
Pure	10.9 (12.0)	60 (63)	63 (75)	187 (253)	136 (182)	73 (71)
Mixed	10.0 (11.5)	57 (56)	54 (69)	106 (180)	29 (63)	26 (31)
Widely Scatt.	10.0 (10.8)	56 (56)	44 (57)	101 (143)	8 (13)	7 (10)

*Each cell contains an average based on the number of sites and an (average based on acreage).

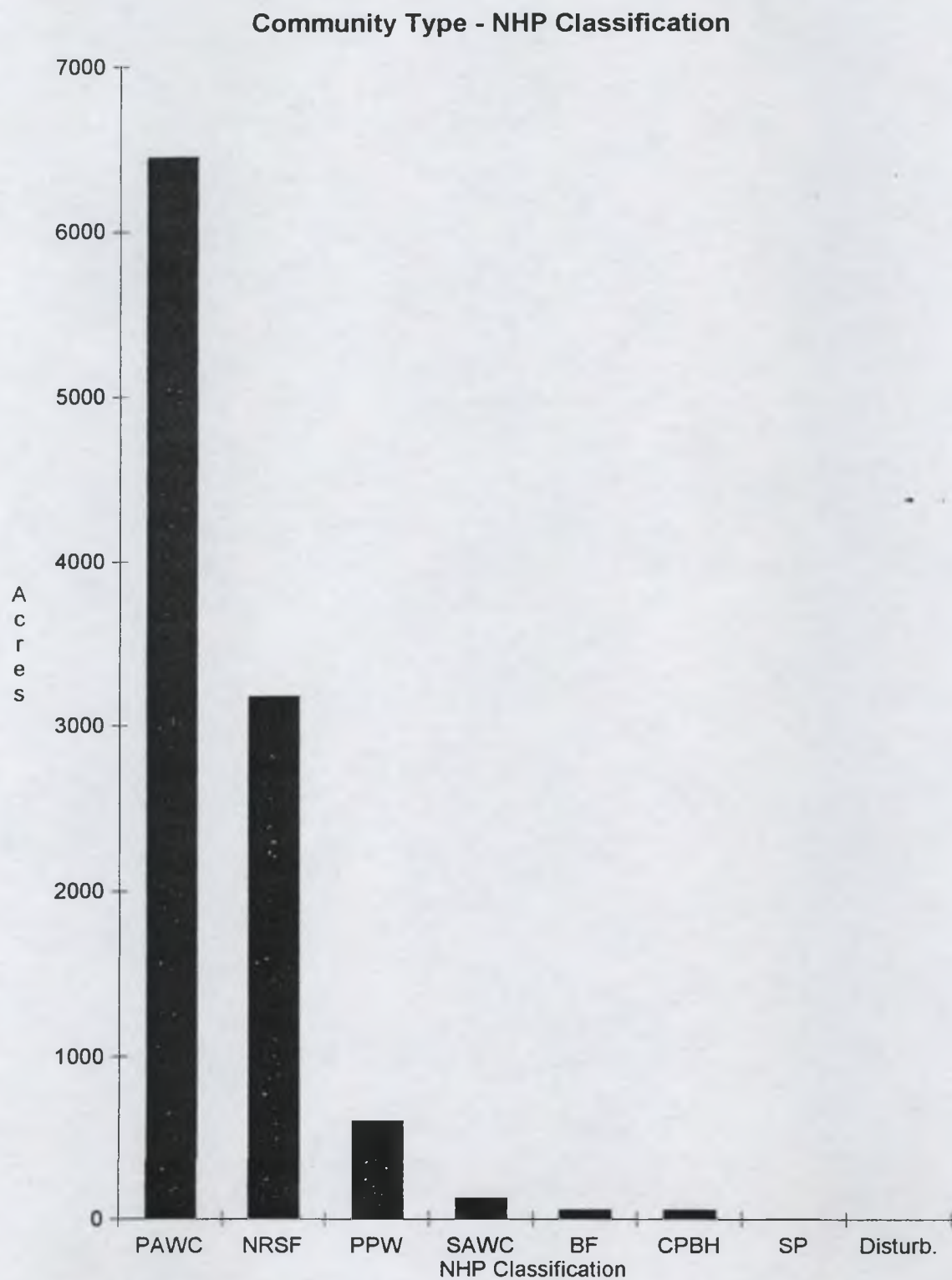


Figure 1. Community type occurrence for North Carolina based on Natural Heritage - Program classification.

Peatland Atlantic White Cedar - NonRiverine Swamp Forest - Pond Pine Woodland -
Streamhead Atlantic White Cedar - Bay Forest - Coastal Plain Bottomland Hardwood -
Streamhead Pocosin

Ownership Distribution North Carolina

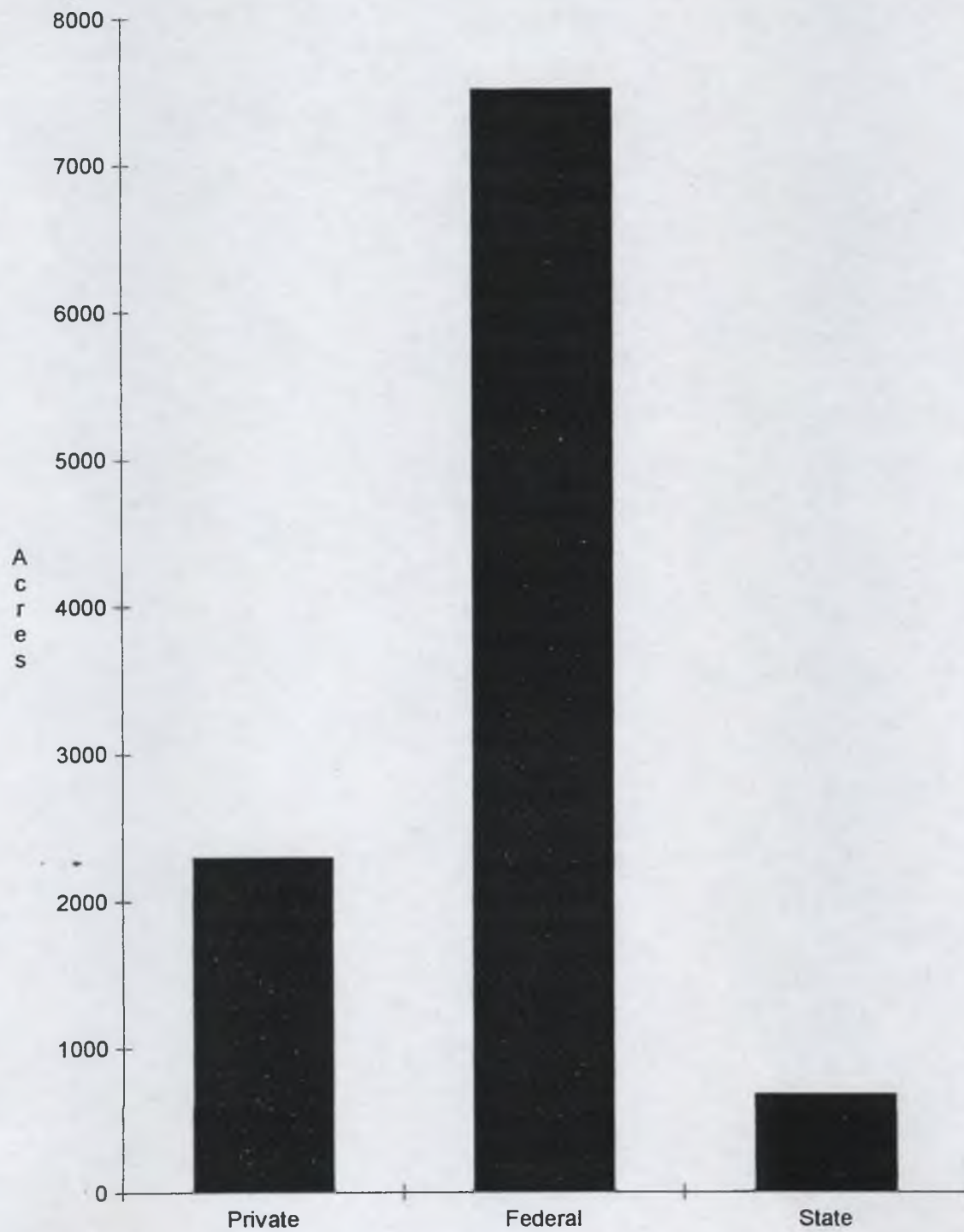


Figure 2. Ownership distribution for North Carolina.

Age Class Distribution Statewide and Dare Range

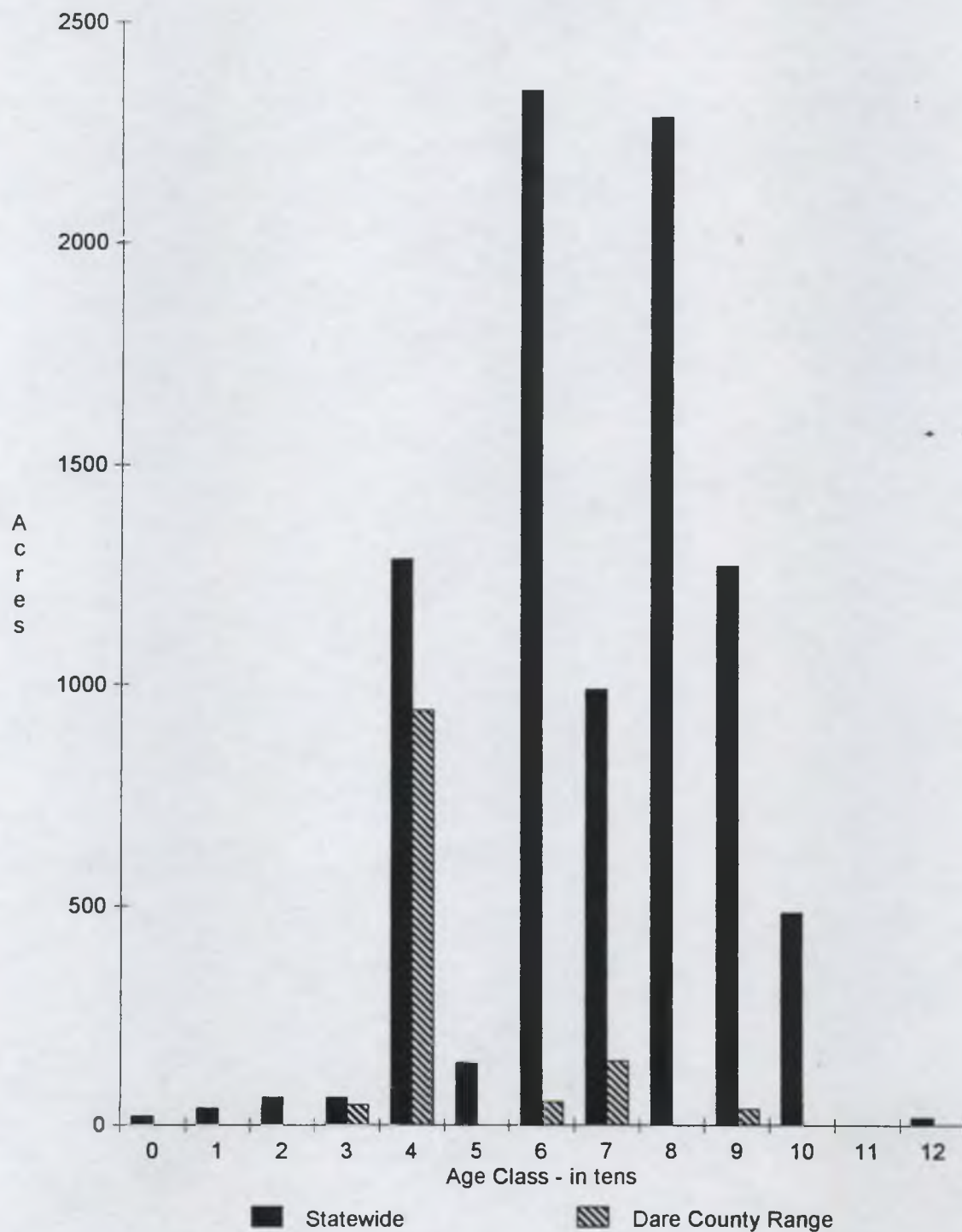


Figure 3. Age class distribution for entire state and for Dare County Range.

STUDY METHODS

This inventory was commissioned by the U.S. Air Force to identify the location and condition of extant remnant AWC groves and stands in North Carolina, and to compare those sites with remnant sites on the DCR. As such, it is a comprehensive description of the remnant AWC resource rather than a standard forest inventory that focuses on volumes and stocking. For each site visited, the authors gathered data on location, ownership, stand condition and composition, soils, past disturbances where known, and natural community types.

To identify site locations, records of known remnant AWC sites were compiled from DCR files and N.C. Natural Heritage Program (NHP) Element Occurrence files and from knowledgeable individuals representing public agencies, timber companies, conservation organizations, and private landowners. Aerial photographs obtained from U.S. Department of Agriculture offices were studied to identify potential additional sites in approximately 35 counties. Numerous AWC sites were discovered during aerial and ground inspection of known locations.

The authors and their employees visited the majority of the 153 known sites and approximately 30 sites where AWC was suspected but not found. For 19 sites, NHP records or land manager descriptions were used solely. Inaccessible sites in the Northern Outer Coastal Plain were aerially surveyed; funding limitations precluded such inspection of several other remote areas as noted in the county summaries. Once suspected or reported sites were confirmed by ground or aerial examination, the aforementioned photographs were used to measure site and grove/stand acreage using a digital planimeter or English dot grid. Landowner information was derived from county tax offices. Soil types were determined from published surveys.

Precedence was given to visiting sites that were believed to contain groves (less than 2 acres) or stands (2 acres or greater) as opposed to individual or scattered trees. Sites are included, however, that contain residual AWC along drainages or within clearcuts to show the varied conditions in which remnants occur. All plantations were excluded. Sapling regeneration sites, defined as naturally regenerated sites with a dominant diameter class of 5 inches or less, were not inventoried. Sapling groves or stands encountered within or adjacent to mature (6 inch diameter or greater) stands were noted due to their value in future management investigations. Although the authors do not claim this inventory to be exhaustive, they do feel it well represents the location and condition of the majority of mature stands greater than 2 acres.

All locations with confirmed AWC were named using an appropriate road, creek, or nearby community. Site codes were assigned that correspond with the county map legends; existing NHP Element Occurrence names and codes were noted and included in the site descriptions.

Acreages were calculated as described above and are given in the site descriptions for both "Site Size" and "AWC Size". Where an AWC stand occurs as a distinct community surrounded

by a distinctly different community, the Site Size and AWC Size are the same. If the AWC occurs as scattered groves or stands within a larger community that does not include AWC, the Site Size is a measure of the smallest polygon that would encompass all of the AWC. If a pure AWC stand grades into a non-AWC community, the Site Size includes the transition zone. Boundary determinations for many stands and most sites are somewhat subjective due to the amorphous nature of mosaic communities.

Natural Community Type designations follow NHP designations. Many sites contain multiple types due to community variations that occur because of soil patterns, landforms, or human disturbance. Likewise, many sites are transitional between designations, and so have more than one type listed.

Because potential management of AWC is of interest to the study sponsor, site data was collected from a management as well as ecological perspective. For each site, canopy, midstory, understory, and herbaceous composition was identified. Measurements of tree heights, diameters, densities, ages, and basal areas were taken. Heights are reported as total height in feet. Diameters are reported in inches at 4.5 feet above ground (breast height). Ages were determined by increment borings and are reported in years.

Basal areas are reported as the sum of the cross sectional areas (at 4.5 above ground) in square feet per acre. Basal areas are reported for all tree species combined and for AWC individually and thus are used to determine the proportion of the grove or stand occupied by AWC. If the AWC basal area is 50% or more of the total, the stand is considered "pure"; if the AWC basal area is 10-49% of the total, the stand is considered "mixed"; and if it is less than 10% of the total, the stand is considered "widely scattered".

Any discernible evidence of past management or natural disturbance such as fire scars, high water marks, erosion, road construction, land clearing, timber harvest, and storm damage was also noted.

All data were collected by the authors or their employees with exceptions noted on the "Inspection Type" line of the site descriptions.

DARE COUNTY RANGE OVERVIEW AND STATEWIDE COMPARISONS

This section describes the history and current status of AWC on the DCR, and compares statewide site characteristics with those found on the DCR. Recommendations and conclusions regarding AWC management are the responsibility of the study sponsor or other users.

Dare County Range Overview

The DCR, located on the Dare County mainland, contains the second largest AWC acreage in North Carolina. Of the total statewide AWC acres identified (10,583), 2242 acres (21.2%) occur in pure, mixed, and widely scattered stands on the DCR excluding 40 year old Westvaco plantations and more recent U.S. Air Force plantations. The DCR total includes 21.4% (1231 acres) of the statewide pure acreage, 9.5% (145 acres) of the statewide mixed acreage, and 30% (866 acres) of the statewide widely scattered acreage. The largest AWC holding is located immediately north, west, and south of the DCR, owned by the U.S. Fish and Wildlife Service, and administered by the Alligator River NWR. The Refuge AWC acreage totals 4152 with 3734 acres in Dare County and 418 acres in Hyde County.

The AWC sites identified for the DCR and the Refuge are part of the same sprawling peatland communities and so it is difficult to distinguish the comparative resource values of one without considering the other. Nevertheless, Refuge sites are combined with the non-DCR statewide sites in all comparisons. It should be noted, however, that from an ecosystem viewpoint, the significance of the DCR and Refuge ownerships are complementary. Within their combined boundaries, the AWC acreage (5976) represents 56.5% of the statewide total, is relatively unfragmented, lies within an intact peatland mosaic, and has fewer hydrologic disruptions than most sites found elsewhere in North Carolina (Fussell 1995).

The DCR and Refuge share a similar logging history. A period of extensive cutting on the Dare mainland began in 1875 when Baird and Roper, Inc. acquired the cutting rights to most of the 190,000 acre area. By the early 1920s, all of the accessible sawtimber on approximately 160,000 acres had been removed by Richmond Cedar Works, Camp Manufacturing, East Lake Lumber Company, and the Dare Lumber Company, the last of which cut most of the wood on the area known as the DCR (Research Triangle Institute 1992). Richmond Cedar Works continued logging on the mainland until 1953 when it sold its rights to West Virginia Pulp and Paper Company (Westvaco). Westvaco elaborated the access road and canal system and logged the DCR portion of the mainland until 1975; other portions were sold to First Colony Farms in 1973. MacMillan Bloedel, Inc. and the Alligator Timber Company logged the DCR from 1975 - 1985 and from 1985 - 1989 respectively; their operations included the clearcutting of 2000 acres of AWC (N.C. Natural Heritage Program 1995). Meanwhile, the U.S. Air Force acquired the land known as the DCR in 1977 after having leased portions of it since 1964. The U.S. Air Force purchased remaining timber rights in 1981 and established a forestry management program in 1985 (Smith 1994).

The current coverage of AWC on the DCR is less than what existed prior to the above described logging period and DCR establishment (Frost 1987, Moore and Laderman 1987, N.C. Natural Heritage Program), although the extent of the difference is unknown. The vast majority of AWC now occurs on the western half of the ownership where it is dominant or codominant with loblolly pine, pond pine, swamp black gum, red maple, and baldcypress. The largest AWC acreage occurs in a contiguous block bounded by Beechland, Maple, Dry Ridge, and Sycamore Roads and is also known as Forestry Compartments 7 and 8 (Steve Daniels, pers. comm.). Other notable areas include the Hooper Road and Whipping Creek block (Compartment 7) and the H&B and Dry Ridge block (Compartment 3). Contained within these areas are approximately 1231 acres of pure mature AWC, 145 acres of mature mixed AWC, 866 acres of mature but widely scattered AWC, and 2100 acres of 2-20 year old AWC clearcuts with varying amounts of AWC regeneration. Based on adjacent forest composition, AWC was likely present prior to DCR establishment on portions of the areas cleared for the Navy and Air Impact Areas (4660 acres) and Air Force Lead Roads (N.C. Natural Heritage Program 1995). In addition, ongoing research has revealed evidence of old AWC logs buried in the deep peat that underlays the low pocosin between the Air Force impact area and Back Lake (Scott Harris, pers. comm.).

Currently, active management of AWC is relatively rare statewide. A number of privately owned sites have evidence of recent clearcuts or selective cuts. Additionally, some have undergone recent timber stand improvement to decrease undesirable competition in naturally regenerating AWC stands (K.O. Summerville, pers. comm.). The majority, however, show little or no active management within the last 40 years. Nevertheless, the allelic richness of these smaller sites possesses has great potential to contribute to the perpetuation of AWC statewide (Claire Williams, pers. comm.). The value of groves and stands as gene conservation pools is mainly promoted by the N.C. Division of Forest Resources (K.O. Summerville, pers. comm.) and the Weyerhaeuser Company (Hughes, unpubl.).

Little management is being conducted on mature non-DCR publicly owned sites. A number of recent seed tree and heavy seed tree cuts are associated with research designed to perpetuate AWC regeneration on the Great Dismal Swamp National Wildlife Refuge (Brownlie, unpubl.). The remaining mature remnant stands that are publicly owned have no obvious ongoing site or component manipulation.

In contrast, active management is underway in AWC sites on the DCR. Of the total 46,600 acres on the DCR, 33,650 are categorized as commercial forestland in the DCR Integrated Forest Management Plan (Smith 1994). As outlined in the IFMP, mature AWC stands are included in a Fiscal Year 1994-1999 activities schedule and in the AWC Ecosystem Restoration Project funded through the Department of Defense Legacy Resource Management Program. The latter calls for inventorying cutover and remnant AWC stands (in process), developing harvest techniques that facilitate AWC regeneration, developing artificial regeneration techniques with provenance and extraction studies and various site preparation methods, and implementing a hydrology restoration program. Although much of this activity is being conducted in 10-20 year old clearcuts on the DCR and the Refuge, the harvest technique development is being carried out

in mature stands on the DCR only. During the past five years, 70 acres of mature AWC has been clearcut as part of this program with more scheduled for cutting through Fiscal Year 1999 (Scott Smith, pers. comm., and Smith 1994).

Statewide and DCR Site Comparisons

Seven Natural Community types are identified for the 153 sites statewide. Of these, 3 are used to characterize the DCR sites including Peatland Atlantic White Cedar, Nonriverine Swamp Forest, and Bay Forest. On the DCR, the three communities have substantial overlap with an occasional Pond Pine Woodland element in the ecotone.

The Peatland Atlantic White Cedar communities found statewide and on the DCR are typically pure, even-aged stands. On the DCR, the canopy is dominated by AWC with varying densities of loblolly pine, swamp black gum, red maple, and baldcypress with scattered sweet bay and pond pine. The most frequently occurring shrubs include fatterbush, inkberry, sweet gallberry, and sweet pepperbush. The herb layer coverage is variable and often includes netted chain-fern and peatmosses.

The Nonriverine Swamp Forest sites found statewide and on the DCR tend to be dominated by swamp black gum and red maple with occasional to frequent AWC, baldcypress, loblolly pine, pond pine, and sweet bay. The density of AWC in this type on the DCR is quite variable, possibly a result of selective cutting during the past century (Moore and Carter 1987). The shrub layer is dominated by red and swamp bay, fatterbush, inkberry, and sweet pepperbush. The herb layer is barren or contains scattered patches of peatmosses and various ferns.

The Bay Forest sites are dominated by sweet bay, loblolly bay, and/or red bay with scattered emergent AWC, loblolly pine, pond pine, and baldcypress. The shrub layer is variable with developing bays, red maple, fatterbush, titi, sweet gallberry and inkberry. Herbs include various ferns and peatmosses.

Thirty-six soil series occur statewide within the known AWC types. Of these, five occur on the DCR. Dominant are the deep organics of the Pungo series and the shallower organics of the Ponzer and Belhaven series. Also present are the Roper series, a mineral soil with an organic surface layer, and Hyde loam, a poorly drained mineral soil with a thick organic loam surface.

DCR and statewide average stand measurements are shown in Tables 8 and 9. Average tree diameters (dbh) based on acreage range from 9 to 12.1 inches. Although many statewide and DCR sites have individual trees with much greater diameters (e.g., some DCR trees measure 33 inches), these figures represent average stand diameters. The largest average diameters occur in DCR mixed stands, although there is little difference between statewide or DCR stands, whether pure, mixed, or widely scattered.

Average stand heights are also similar from a statewide versus DCR perspective. The tallest average (64 feet) is in the DCR mixed stands; individual trees measured over 80 feet. Overall average heights range from 55-64 feet.

Average stand ages range from 40-75 years. Statewide pure, mixed and widely scattered stand ages are greater than respective DCR stands (75 years vs. 46 years, 69 vs. 67, and 57 vs. 40). Individual trees on the DCR range to 143 years. The age class distribution on a statewide and DCR basis for pure and mixed stands combined is shown in Figure 3. Statewide, the largest age class based on acreage is the 60-69 year group. For the DCR, the largest age class is the 40-49 year group. Overall, 82% of the statewide AWC acreage falls in the 60-100+ year classes. Only 2% is represented by the 20-29 year class and below; this represents the lack of regenerating acreage within the identified sites. It does not indicate a lack of regenerating acreage present in the state since most regenerating sites were excluded from this inventory.

Overall statewide and DCR average stand basal areas (in square feet per acre) vary from a low of 80 in widely scattered stands on the DCR to 253 in statewide pure stands. Although statewide pure stands average more than DCR pure stands (253 vs. 182), the mixed DCR stands average more than the statewide mixed (214 vs. 180). Individual stand basal areas on the DCR range to 360.

Average statewide and DCR AWC basal areas in pure and mixed stands vary from 62-138, representing average AWC coverage of 31-74%. The greatest AWC coverage occurs on pure DCR stands; mixed DCR and statewide stands average 31%.

Mortality and stand deterioration was observed and noted on several statewide and DCR sites. Causes appeared to include lightning strikes, bear damage, saltwater flooding, windthrow associated with red heart rot, and windthrow associated with hurricanes. For most stands, break-up appears to occur beginning around 80 years of age (K.O. Summerville, pers. comm.); in the Great Dismal Swamp NWR, break-up begins around age 65 (Brownlie, unpubl.). On the DCR and statewide, stand deterioration often results in a pure stand being replaced by a mixed stand as swamp black gum and red maple regenerate in the pockets. This community transition to an uneven-aged mixed forest has been documented by other researchers (Buell and Cain 1943, Frost 1987, and Kologiski 1977) and is likely exacerbated by repeated logging, land drainage, and lack of fire.

INVENTORY RESULTS BY COMMUNITY TYPE

All sites were categorized into one or more Natural Community Types based on the type characterizations given in Schafale and Weakley (1990). Complete accounts of each type are available in that reference.

The following community types were identified in descending order of known AWC acreage: Peatland Atlantic White Cedar, Nonriverine Swamp Forest, Pond Pine Woodland, Streamhead Atlantic White Cedar, Bay Forest, Coastal Plain Bottomland Hardwoods, and Streamhead Pocosin (Figure 1 and Table 2). Many of the 153 sites are transitional and therefore have more than one type listed; three sites were listed as generally disturbed. Type variants were not identified.

Peatland Atlantic White Cedar

Of the 10,583 known pure, mixed, and widely scattered AWC acres, 6496 (61.4%) were described as Peatland Atlantic White Cedar. The majority of sites described as such are found in the vast peatlands of the Northern Outer Coastal Plain, around Carolina bays in the Bladen Lakes region, or in portions of the Inner Coastal Plain and Sandhills regions where organic deposits have formed around depressions and swales. Typical soils include deep or shallow organics such as Pungo, Dorovan, Pamlico, and Roper mucks. Many of the sites appear to be seasonally saturated.

In this type, AWC comprises 50% of the canopy and usually 50% or more of the stand basal area and is labeled in this report as "pure". Codominant and midstory species include loblolly and pond pine, swamp black gum, red maple, and baldcypress. The density of the understory varies with canopy closure; typical shrubs and vines include fetterbush, inkberry, sweet gallberry, loblolly bay, red bay, swamp red bay, titi, dangleberry, common greenbrier, and blaspheme vine. The herb layer is somewhat sparse and most often composed of peatmosses and chain-ferns.

In the absence of natural fire, many inventory sites in this category are transitioning to Nonriverine Swamp Forest, Pond Pine Woodland, or Bay Forest, a tendency previously described by Buell and Cain (1943) and Kologiski (1977). Compounding the decline of this community are major hydrologic disruptions that have resulted from logging and drainage. Together, these factors have reduced this community to a fraction of that present prior to 1850 (Frost 1987). As such, The Nature Conservancy has listed this community as globally endangered (Smith 1994).

Nonriverine Swamp Forest

In this inventory, known AWC sites categorized as Nonriverine Swamp Forest total 3200 acres (30.2%). The occurrence of this community is inventorywide on peatlands and wet, poorly

drained flats. Typical soils include organics or mucky minerals such as Pungo and Ponzer mucks. Many of the sites appear to be seasonally saturated or shallowly flooded.

In this type, AWC comprises less than 50% of the canopy and usually less than 50% of the stand basal area. Canopy species are often red maple, swamp black gum, loblolly and pond pine, baldcypress, and tuliptree. Understories are open to impenetrable and include sweet bay, swamp bay, titi, sweet pepperbush, fetterbush, highbush blueberries, common greenbrier, and blaspheme vine. Herbs include peatmosses, chain-ferns, royal fern, and cinnamon fern.

This community often transitions to Pond Pine Woodland and Bay Forest. Many sites labeled Nonriverine Swamp Forest were likely to have been Peatland Atlantic White Cedar sites disrupted by absence of fire or hydrologic alterations (Frost 1987).

Pond Pine Woodland

Inventory sites categorized as Pond Pine Woodland total 613.5 acres (5.8%). Most occur in the Northern Outer Coastal Plain and in the Bladen Lakes region around peatlands, Carolina bays, and swales. Typical soils are shallow organics or mucky minerals such as Croatan, Ponzer, and Roper mucks and Torhunta loam. Some sites appear fairly dry, others seasonally saturated.

The canopy is dominated by pond pine; codominants and midstory species include sweet bay, red maple, loblolly pine, loblolly bay, swamp red bay, and AWC. The understory is usually well developed and often dense; typical species include fetterbush, inkberry, sweet gallberry, titi, sweet pepperbush, dangleberry, and blaspheme vine. Herbs are scant and include cane and chain-ferns.

This type is often found in association with Bay Forest and Peatland Atlantic White Cedar, particularly on the Dare County mainland.

Streamhead Atlantic White Cedar

This community occurs on 135.5 acres of inventory sites (1.3%) in headwater areas and adjacent upslopes in the Sandhills region. Typical soils are acidic with organic layers underlain or mixed with clay and sand such as Johnston and Torhunta loam. Some headwater sites have obvious seeps; upslopes grade to dry.

The canopy dominant is AWC with varying midstories of tuliptree, red maple, swamp black gum, and pond pine. The understory is usually densely vegetated by swamp bay, gallberries, fetterbush, common greenbrier and blaspheme vine. Peatmosses and various ferns comprise the herbaceous layer.

Bay Forest

Inventory sites categorized as Bay Forest comprise 77 acres (0.7%). Most are located around peatlands, Carolina bays, and swales. Excellent examples exist on the Dare County mainland and in the Bladen Lakes region. Typical soils are shallow or deep organics or mucky minerals such as Dorovan, Croatan, and Pamlico mucks. Some appear to be seasonally saturated.

Dominant vegetation is loblolly bay, sweet bay, and swamp bay with swamp black gum, red maple, pond and loblolly pine and AWC. The shrub layer contains fetterbush, inkberry, sweet gallberry, titi, and sweet pepperbush. Herbs include various ferns and occasional peatmosses.

This community type is often found in a mosaic of Peatland Atlantic White Cedar, Nonriverine Swamp Forest, and Pond Pine Woodland as found on the Dare County mainland.

Coastal Plain Bottomland Hardwoods (Blackwater Subtype)

Inventory sites so described total 56 acres (0.5%) and are found most often on natural levees in floodplains such as those found in Brunswick and Columbus Counties along the Waccamaw River. Mineral soils such as Muckalee loam and Woodington fine sandy loam are typical.

In this type, the canopy is dominated by red maple, loblolly pine, sweetgum, AWC, water oak, overcup oak, laurel oak, and willow oak. The midstory often includes red maple, swamp bay, and sweet bay. The understory includes titi, sweet pepperbush, common greenbrier, poison ivy, and grape.

Streamhead Pocosin

This community type accounts for 3.5 acres (0.03%) on five AWC sites identified in this report. All are located along stream headwaters and adjacent upslopes in the Sandhills region. Soils present are similar to those associated with Streamhead Atlantic White Cedar and include Johnston and Bibb loams.

The canopy is dominated by emergent to dense pond and loblolly pine, red maple, tuliptree, swamp black gum, AWC, sweet bay, and sweetgum. The understory is densely vegetated by fetterbush, gallberries, swamp bay, sweet pepperbush, and blaspheme vine. Some ferns are present in the otherwise sparse herb layer.

INVENTORY RESULTS BY REGION

The 153 inventoried sites are categorized into seven landscape regions. In descending order of remnant AWC acreage they are the Northern Outer Coastal Plain, Southern Outer Coastal Plain, Sandhills, Northern Inner Coastal Plain, Middle Outer Coastal Plain, Bladen Lakes, and Middle Inner Coastal Plain. Boundaries of the regions and approximate locations of inventory sites are shown on the statewide map; more precise locations are shown on individual county maps.

Northern Outer Coastal Plain

This region is located in the northeastern section of the state and includes in descending order of AWC acreage Dare, Tyrrell, Camden, Washington, Hyde, Currituck, Pasquotank, Gates, Chowan, Beaufort and Pamlico Counties. With 9823 acres (92.8%) of the known AWC, this region ranks highest in the state. Sixty-one sites with 276 stands were mapped representing 40% and 74.4% of the statewide site and stand totals respectively.

The majority of the sites within this region are described as Peatland Atlantic White Cedar or Nonriverine Swamp Forest and are underlain by Pungo and Dorovan mucks.

The most notable sites are located on the Dare County mainland within the vast peatland mosaic of the Alligator River NWR and the DCR. Together, these two ownerships account for 56.5% of the known remnant AWC in North Carolina. Also noteworthy are several Tyrrell County sites that occur along the western shore of the Alligator River and along the South Fork of the Scuppernong River as well as several Hyde County sites south of the Alligator River. In Camden County the most exceptional sites are the remnants of the Great Dismal Swamp, once the greatest AWC swamp in North Carolina and now administered by the Great Dismal Swamp NWR and the Dismal Swamp SNA. Numerous smaller sites made up of single stands or stand clusters are located in Gates and Chowan counties along the Chowan River, in Pasquotank and Camden counties along the Pasquotank River and North River, in Washington County along Conaby Creek and Bull Bay, and in Currituck County along the North West River. Three small sites are found in eastern Pamlico and Beaufort Counties.

Southern Outer Coastal Plain

This region is located in the southeastern section of the state and includes in descending order of AWC acreage Brunswick, New Hanover, Pender, and Columbus Counties. With 288 known acres, this region has 2.7% of the statewide acreage and ranks second. Thirteen sites with 15 stands were mapped representing 8.5% and 4% of the statewide site and stand totals respectively.

The sites within this region are described as Coastal Plain Bottomland Hardwoods along the Brunswick and Columbus County sides of the Waccamaw River, and as Nonriverine Swamp Forest and Bay Forest in the interior portions of Brunswick and Pender Counties and along the Northeast Cape Fear River in New Hanover County. Major soils present are Muckalee loam and Dororvan muck.

The most notable county in this region is Brunswick which has 8 sites totaling 253 acres and ranks seventh in the state. Known Brunswick County sites occur in largely inaccessible locations along the Waccamaw River and in more easily traversed portions of the Green, Big, Rattlesnake, and Lewis Swamps. The two Columbus County sites are located along the western shore of the Waccamaw River, as with the Brunswick sites, need aerial inspection for more accurate delineation and description. Pender County has two small sites, one near the Sandy Run Swamp and the other near the headwaters of the Trumpeter Swamp in the Holly Shelter Game Land. The one known site in New Hanover County is just south of the Northeast Cape Fear River.

Sandhills

This region includes in descending order of AWC acreage Cumberland, Hoke, Moore, Lee, Richmond, Scotland, and Harnett Counties. With 194.5 known acres, this region has 1.8% of the statewide acreage and ranks third. Forty-eight sites with 48 stands were mapped representing 31.4% and 13% of the statewide site and stand totals respectively.

The sites within this region are described as Streamhead Atlantic White Cedar (with some transitioning to Bay Forest), Bay Forest, Nonriverine Swamp Forest, Peatland Atlantic White Cedar, Streamhead Pocosin and Pond Pine Woodland. Major soils present are Johnston loam, Torhunta & Lynn Haven, and Bibb loam.

The most notable counties in this region are Cumberland which has 13 sites totaling 76.5 acres and Hoke with 17 sites totaling 44 acres. They rank tenth and thirteenth in the state respectively. The majority of the sites occur in narrow drainages and upslope seeps associated with sandridges dominated by longleaf pine and turkey oak. Known Cumberland sites occur in within 5 miles of the Cape Fear River and on Ft. Bragg. Most of the Hoke sites occur on Ft. Bragg. Moore County also has Ft. Bragg sites as well as a privately owned site near Pine Bluff Lake. One Lee County site is in the Juniper Springs area and a second is part of a larger site that straddles the Moore County line. Most of the Richmond County sites are on the Sandhills Game Land in drainages associated with Naked, Millstone, and Drowning Creeks. Scotland also has a site near Drowning Creek and one near Big Muddy Lake on Camp Mackall. Of the three Harnett County sites, two are along Ft. Bragg drainages and one is near the Little River.

Northern Inner Coastal Plain

This region includes in descending order of AWC acreage Wayne, Hertford, and Wilson Counties. With 150 known acres, this region has 1.5% of the statewide acreage and ranks fourth. Three sites with 4 stands were mapped representing 2% and 1% of the statewide site and stand totals respectively.

The sites within this region are described as Peatland Atlantic White Cedar and Bay Forest. Major soils present are Dorovan muck and Torhunta loam.

The most notable site in this region consists of two stands totaling 90 acres in southeastern Wayne County. The Hertford County site is located near the Chowan River and the Wilson County site is near Juniper Creek.

Middle Outer Coastal Plain

This region includes in descending order of AWC acreage Jones, Onslow, and Craven Counties. With 58 known acres, this region has 0.5% of the statewide acreage and ranks fifth. Eight sites with 9 stands were mapped representing 5% and 2.4% of the statewide site and stand totals respectively.

The sites within this region are described as Nonriverine Swamp Forest, Coastal Plain Bottomland Hardwoods, and Bay Forest. Major soils present are Woodington fine sandy loam, Muckalee loam, Marvyn loamy sand, and Croatan, Dare, Ponzer, and Dorovan mucks.

The most notable site in this region is a 30 acre stand in western Jones County. Three sites are in Onslow County on Camp LeJeune including two near creeks associated with the New River and one in the Great Sandy Run Pocosin. Craven County has four sites, one near Little Lake, one near Catfish Lake, one along the Neuse River Swamp, and one in the Bear Hole Pocosin.

Bladen Lakes

This region includes eight sites located in Bladen County, most in the vicinity of Jones Lake State Park and Bladen Lakes State Forest. With 50 known acres, this region has 0.5% of the statewide acreage and ranks fifth with the Middle Outer Coastal Plain. Nine sites with 9 stands were mapped representing 6% and 2.4% of the statewide site and stand totals respectively.

The sites within this region are described as Peatland Atlantic White Cedar, Pond Pine Woodland, Bay Forest, and Streamhead Atlantic White Cedar with a great deal of transitioning between stands. Major soils present Pamlico muck and Lynn Haven & Torhunta.

All of the known sites are within 5 miles of the Cape Fear River. Most are associated with Carolina bays in the Jones Lake vicinity. Average stand size is 5 acres but ranges from less than 1 to 35 acres. Most of the AWC is in small, fairly pure dense stands that have well developed midstories.

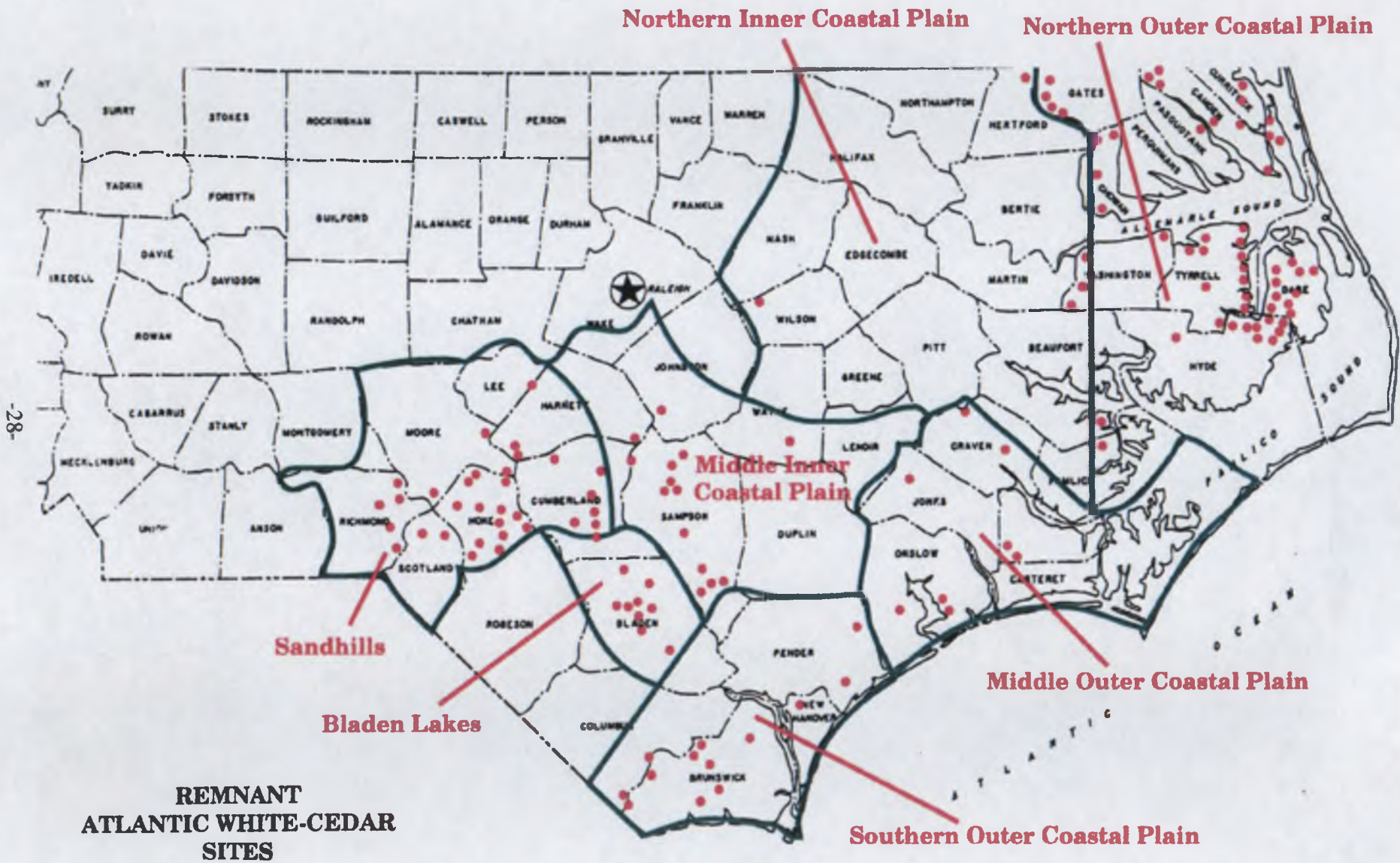
Middle Inner Coastal Plain

This region includes Sampson and Johnston Counties. With 20 known acres, this region has 0.2% of the statewide acreage and ranks last of the seven regions. Eleven sites with 11 stands were mapped representing 7% and 3% of the statewide site and stand totals respectively.

The sites within this region are described as Nonriverine Swamp Forest and Bay Forest. The major soils present are Rains loamy sand, Goldsboro loamy sand, and Torhunta fine sandy loam.

All of the 10 known Sampson County sites are within 5 miles of the South River and are of generally low quality. Most sites have been logged within the last 7 years and have dense pockets of regenerating AWC or scattered mature residuals. The single Johnston County site is a 0.5 acre stand located near Jumping Run.

NORTH CAROLINA



Currituck County

Currituck County has four known AWC stand cluster sites, two along the North West River, one west of Coinjock Bay and one between Indian Creek and North River on the North River Game Land. AWC acreage totals 352, ranking Currituck County sixth in the state in terms of AWC abundance. Stand size ranges from 1 - 77 acres; AWC coverage varies from 25-60%. All sites required aerial inspection; one was also visited on foot.

Associates include loblolly and pond pine, red maple, swamp black gum and sweetgum. Understories include swamp bay, fetterbush, American holly, doghobble, and gallberries. No AWC regeneration was noted.

The natural community type presents are Peatland Atlantic White Cedar and Nonriverine Swamp Forest. The soil types are Dorovan and Dare mucks.

The one noteworthy site is the North River Game Land (CURR 04) which contains seven mature stands dominated by AWC (60%). According to a NCWRC report (1980), these stands have mortality rates of 17-81%, the highest being in the lowest elevations. Mortality was predicted to have occurred 30-50 years previous to the 1979 data collection and therefore could reflect natural attrition or natural disturbance (such as saltwater flooding). Outlooks for AWC regeneration were doubtful because of dense litter layers and nearly impenetrable understories, both of which would preclude sufficient light penetration to the forest floor. Further investigation of this would provide insight into AWC management in low elevation areas near saltwater. Current ages likely range from 75-120+ with diameters from 8-23 inches.

Key to Remnant Atlantic White-cedar Inventory Sites - CURRITUCK COUNTY

Label Number

Site Name

CURR 01

Nellie Bell Pond

CURR 02

Northwest River Marsh

CURR 03

Great Swamp

CURR 04

North River Game Land

CURRITUCK COUNTY

Nellie Bell Pond - CURR 01

Site Size: 150 ac
AWC Size: 12 ac; 2 stands
NHP EO Code: 00625*014
Location: Northern Currituck County 4 miles east of Moyock; in Nellie Bell Pond, just south of western creek off North West River, approx. 1.5 miles north of SR 1222.
Description: Two mature stands dominated by AWC and pine.
DBH (inches): AWC : unk
Height (feet): AWC : unk
Age: AWC: unk
Basal Area (square feet): AWC: unk Stand: unk; AWC coverage: 50%
Ownership: Private
Soil: Dorovan mucky peat
Natural Community Type: Peatland Atlantic White Cedar and Nonriverine Swamp Forest
Inspection Type: Aerial

Northwest River Marsh - CURR 02

Site Size: 100 ac
AWC Size: 25 ac; 3 stands
NHP EO Code: none
Location: Northern Currituck County; northwest of Tull Bay; 0.5 mile north of North West River and 1.5 miles south of SR 1249.
Description: Three mature stands dominated by AWC and pine.
DBH (inches): AWC : unk
Height (feet): AWC : unk
Age: AWC: mature
Basal Area (square feet): AWC: unk Stand: unk; AWC coverage: 30%
Ownership: Private
Soil: Dorovan mucky peat
Natural Community Type: Nonriverine Swamp Forest
Inspection Type: Aerial

Great Swamp- CURR 03

Site Size: 30 ac

AWC Size: 15 ac; 3 stands and along roadside

NHP EO Code: none

Location: Western Currituck County in Great Swamp, along and north of US 158 approx. 3 miles east of intersection with SR 1200 and 1.5 miles west of SR 1246.

Description: Three mature stands dominated by AWC and pine. Additional AWC scattered along highway with loblolly pine, swamp blackgum, red maple and sweetgum. Understory of swamp bay, American holly, and fetterbush. Herbs include cane and peat moss. Fire sign. Many AWC snags. Open canopy. No AWC regeneration.

DBH (inches): AWC (roadside): 9-14

Height (feet): AWC (roadside): 60

Age: AWC (roadside): 50-60

Basal Area (square feet): AWC(roadside): 80; Stand: 320; AWC coverage: 25%

Ownership: Public (State of North Carolina - NCSU)

Soil: Dare muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground and Aerial

North River Game Land - CURR 04

Site Size: 3000 ac

AWC Size: 300 ac; 7 stands from 19-77 acres each

NHP EO Code: none

Location: Western Currituck County on North River Game Land in Great Swamp; Gregory and Taylor tracts; approx. 4 miles west of Coinjock, 0.5 - 4 miles south of US 158 and 0.25 - 4 miles east of East Canal and North River. Not accessible by foot.

Description: Seven mature stands dominated by AWC, loblolly pine, swamp blackgum, and red maple. Understory of red bay, inkberry, sweet gallberry, and fetterbush. AWC mortality varies from 17-81%. Highest mortality in stands of lowest elevation. No AWC regeneration.

DBH (inches): AWC (roadside): 8-23

Height (feet): AWC (roadside): unk

Age: AWC (roadside): 75-120+

Basal Area (square feet): AWC (roadside): unk; Stand: unk; AWC coverage: 60% (cruise data)

Ownership: Public (NCDEHNR - North River Game Land)

Soil: Dare muck and Dorovan mucky peat

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: NCWRC files



Camden County

Camden County has four known AWC sites, one large site with several stand clusters in the Great Dismal Swamp, one site with several stands along the Pasquotank River, one west of the North River in an area known as the Green Sea, and one north of Broad Creek. Additional mixed AWC acreage might be present in inaccessible areas south of Broad Creek; widely scattered AWC is present but was not reported for the Green Sea and Broad Creek vicinities. Total pure and mixed AWC acreage totals 827, ranking Camden County the third in the state with regards to AWC abundance. Stand sizes range from 2 - 100 acres; AWC coverage varies from 10 - 70+%. Two sites required aerial inspection.

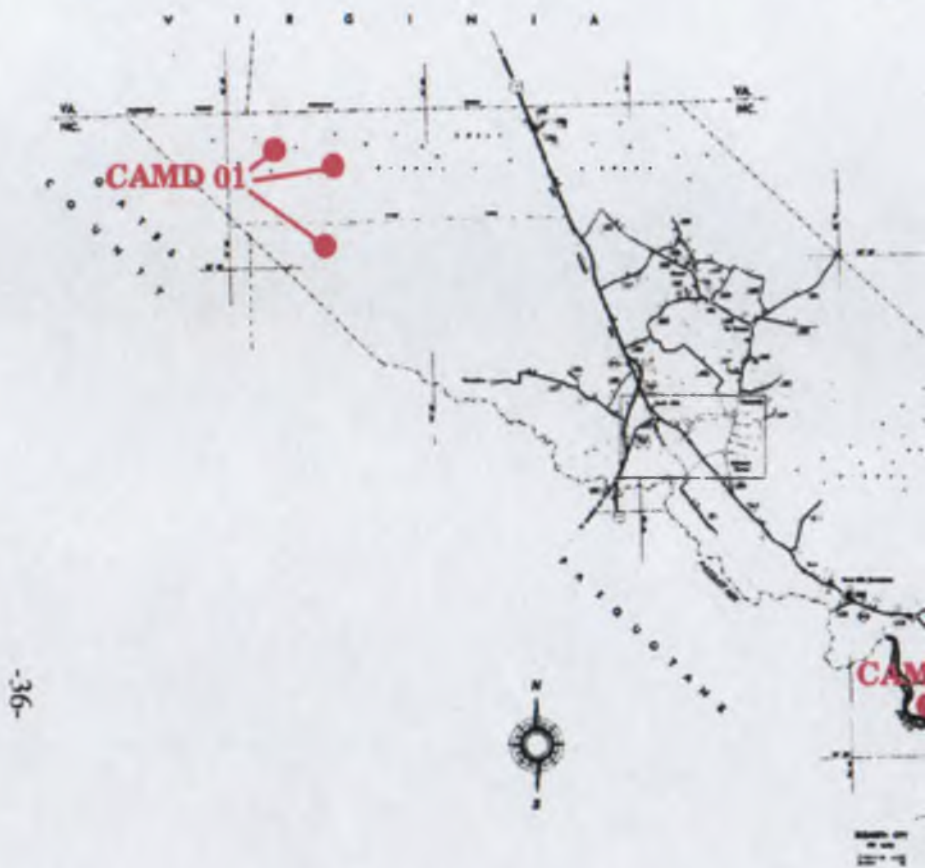
Associates include red maple, swamp black gum, loblolly pine, baldcypress, and sweet bay. Typical understories include red and swamp bay, fetterbush, sweet pepperbush, American holly, highbush blueberry, blackberry, inkberry, sweet gallberry, dangleberry, greenbrier, blasphem vine, and Virginia and netted chain-fern. AWC regeneration was noted near several stands.

Natural community types include Peatland Atlantic White Cedar and Pond Pine Woodland. Dominant soils include Dorovan and Pungo mucks.

Noteworthy stands include the those described within Great Dismal Swamp NWR and SNA. Both the Refuge sites (CAMD 01 A&C) and the SNA sites (CAMD 01B) are part of the Great Dismal Swamp that occurs in portions of Currituck, Camden, Gates, Perquimans, and Pasquotank Counties and share a history of hydrologic alteration and timber exploitation. Likewise, the forested habitats in these adjoining public ownerships formerly predominated by AWC and baldcypress are currently dominated by more euryhydric species such as red maple and its associates (Brownlie, unpubl.).

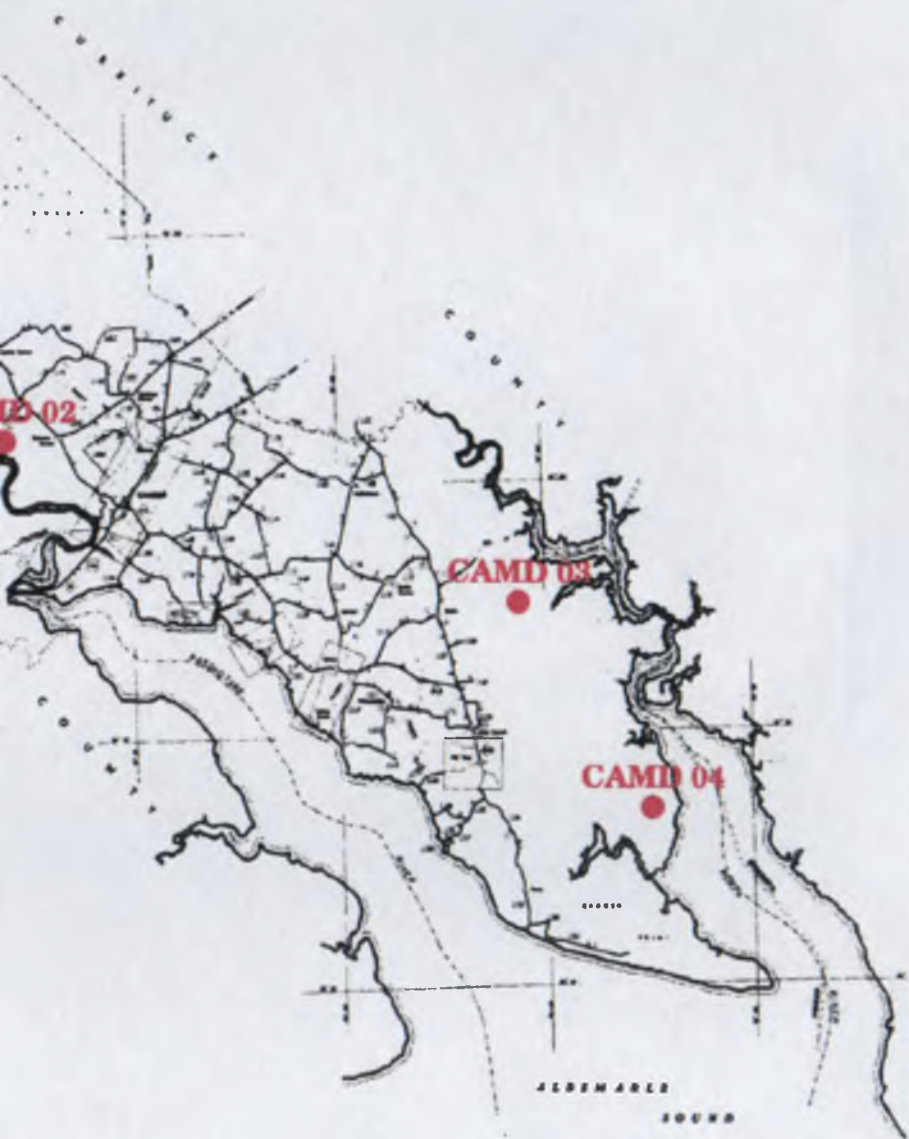
The North Carolina portion of the Great Dismal Swamp NWR occurs in of Camden, Gates and Perquimans counties. All of the inventoried sites on the refuge occur in Camden County, although widely scattered AWC probably exists within forests dominated by swamp black gum and red maple in Gates and Perquimans Counties. An additional 300-400 acres of widely scattered AWC may be present on the Refuge but was not inventoried for this report. The mature and young-mature refuge stands are remnants of selective cuts conducted from the 1930s until the 1960s. Additional areas (acres uncertain) of 20-25 year old AWC regenerated after cutting in the early 1970s.

The SNA sites represent the purest mature AWC for that location. LeGrand (1994) reported an AWC component on 890 acres of the SNA. The majority of this probably occurs in widely scattered stands and was not visited or included in this report.



CAMDEN COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - CAMDEN COUNTY

Label Number

Site Name

CAMD 01

Great Dismal Swamp NWR and SNA

CAMD 02

Pasquotank River (Camden)

CAMD 03

The Green Sea

CAMD 04

Broad Creek

CAMDEN COUNTY

Great Dismal Swamp NWR and SNA- CAMD 01

Site Size: 1500 ac
AWC Size: 450 ac; 3 subsites; A: 211 ac; B: 130 ac; C: 160 ac
NHP EO Code: 00645*006
Location: Northwestern Camden County on Great Dismal Swamp National Wildlife Refuge and Dismal Swamp State Natural Area.

CAMD 01A

Description: Three stands totaling 211 acres north and south of Corapeake Road between Sherrill Ditch and Forest Line Ditch. Mature forest dominated by AWC with codominant red maple and sweetbay. Understory of sweet pepperbush, swamp bay, red bay, fetterbush, American holly, highbush blueberry, dangleberry, poison ivy, and Virginia creeper. Herbs include cinnamon fern and netted chain-fern.

DBH (inches): AWC : 15-18

Height (feet): AWC : 80

Age: AWC: 61-75

Basal Area (square feet): AWC: 210; Stand: 330; AWC coverage: 65%.

Ownership: Public (US Fish and Wildlife Service - Great Dismal Swamp NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

CAMD 01B

Description: Two stands totaling 130 acres south of Kim Saunders Ditch and east of Forest Line Ditch intersection. Mature forest dominated by AWC with codominant red maple. Dense understory of sweet pepperbush, swamp bay, fetterbush, American holly, highbush blueberry, dangleberry, poison ivy, and Virginia creeper. Herbs include cinnamon fern and Virginia chain-fern. Oldest trees in western stand have heart rot.

DBH (inches): AWC : 8-20

Height (feet): AWC : 50-65

Age: AWC: 70-80+ (heart rot)

Basal Area (square feet): AWC: 150; Stand: 310; AWC coverage: 50%.

Ownership: Public (NCDEHNR - Dismal Swamp SNA)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

CAMD 01C

Description: Six stands totaling 160 acres east of Forest Line Ditch, north and south of Cross Canal and east of County Line Road. Mature forest dominated by AWC with codominant red maple. Dense understory of sweetbay, swamp bay, pawpaw, inkberry, dangleberry, poison ivy, and Virginia creeper. Herbs include cane and cinnamon fern.

DBH (inches): AWC : 8-20

Height (feet): AWC : 60-80

Age: AWC: 60

Basal Area (square feet): AWC: 115; Stand: 165; AWC coverage: 70%.

Ownership: Public (USFWS - Great Dismal Swamp NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

Pasquotank River (Camden) - CAMD 02

Site Size: 1000 ac

AWC Size: 98 ac; 9 stands from 2 - 28 acres each

NHP EO Code: none

Location: Western Camden County along eastern shore of Pasquotank River, west of NC 343 from Burnt south to approx 2 miles south of Spences Corner. Not accessible by foot.

Description: Nine stands dominated by mature AWC, pine, and hardwoods. Two stands (37 acres) are approx. 10% AWC, 4 stands (46 acres) are 30%, 1 stand (3 acres) is 50%, and 2 stands (12 acres) are 70%. Two additional stands (17 acres) have been recently clearcut and are regenerating in AWC and pine.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: mature

Basal Area (square feet): unk; overall AWC coverage: 10->70%.

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Aerial

The Green Sea- CAMD 03

Site Size: 300 ac

AWC Size: 178 ac; 3 stands; 1 stand 18 acres, 1 stand 60 acres, 1 stand 100 acres

NHP EO Code: 00640.031

Location: Eastern Camden County; approx 1 mile east of SR 1107, 1 mile west of Great Creek, south and southeast of Garlingtons Island Road. Not accessible by foot.

Description: Three stands dominated by mature AWC, pine, and hardwoods. Additional acreage west of site has AWC widely scattered (<10%). Additional acreage east of site has AWC regeneration in recent clearcut.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: mature

Basal Area (square feet): unk; overall AWC coverage: <10-50%.

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Pond Pine Woodland and Peatland Atlantic White Cedar

Inspection Type: Aerial

Broad Creek - CAMD 04

Site Size: 50 ac

AWC Size: 50 ac

NHP EO Code: none

Location: Southeastern Camden County; approx 1 mile west of North River and 2 miles north of Broad Creek. Not accessible by foot.

Description: One stand dominated by mature AWC, pine, and hardwoods. Area south of Broad Creek might have additional AWC.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: mature

Basal Area (square feet): unk; overall AWC coverage: 50%.

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Aerial

Pasquotank County

Pasquotank County has one known AWC site, a cluster of eight stands totaling 39 acres along the western shore of the Pasquotank River from Turners Cut to Goat Island. Additional widely scattered AWC is present in adjacent areas. Stand sizes range from 0.5 - 14 acres; AWC coverage varies from 30 - 50%. All stands required aerial inspection.

Associates include mixed hardwoods and pine. No AWC natural regeneration was noted.

The natural community type present is Peatland Atlantic White Cedar which in some stands is transitioning to Nonriverine Swamp Forest. The single soil type is Dorovan muck.



PASQUOTANK COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - PASQUOTANK COUNTY

Label Number

Site Name

PASQ 01

Pasquotank River (Pasquotank)

PASQUOTANK COUNTY

Pasquotank River (Pasquotank) - PASQ 01

Site Size: 1000 ac

AWC Size: 39 ac; 8 stands from 0.5 - 14 acres each

NHP EO Code: none

Location: Eastern Pasquotank County along western shore of Pasquotank River, east of US 17/158 from Turners Cut south to Goat Island. Not accessible by foot.

Description: Eight stands dominated by mature AWC, pine, and hardwoods. Seven stands (29 acres) are approx. 30% AWC, 2 stands (10 acres) are 50%.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: mature

Basal Area (square feet): unk; overall AWC coverage: 30-50%.

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar and Nonriverine Swamp Forest

Inspection Type: Aerial

Gates County

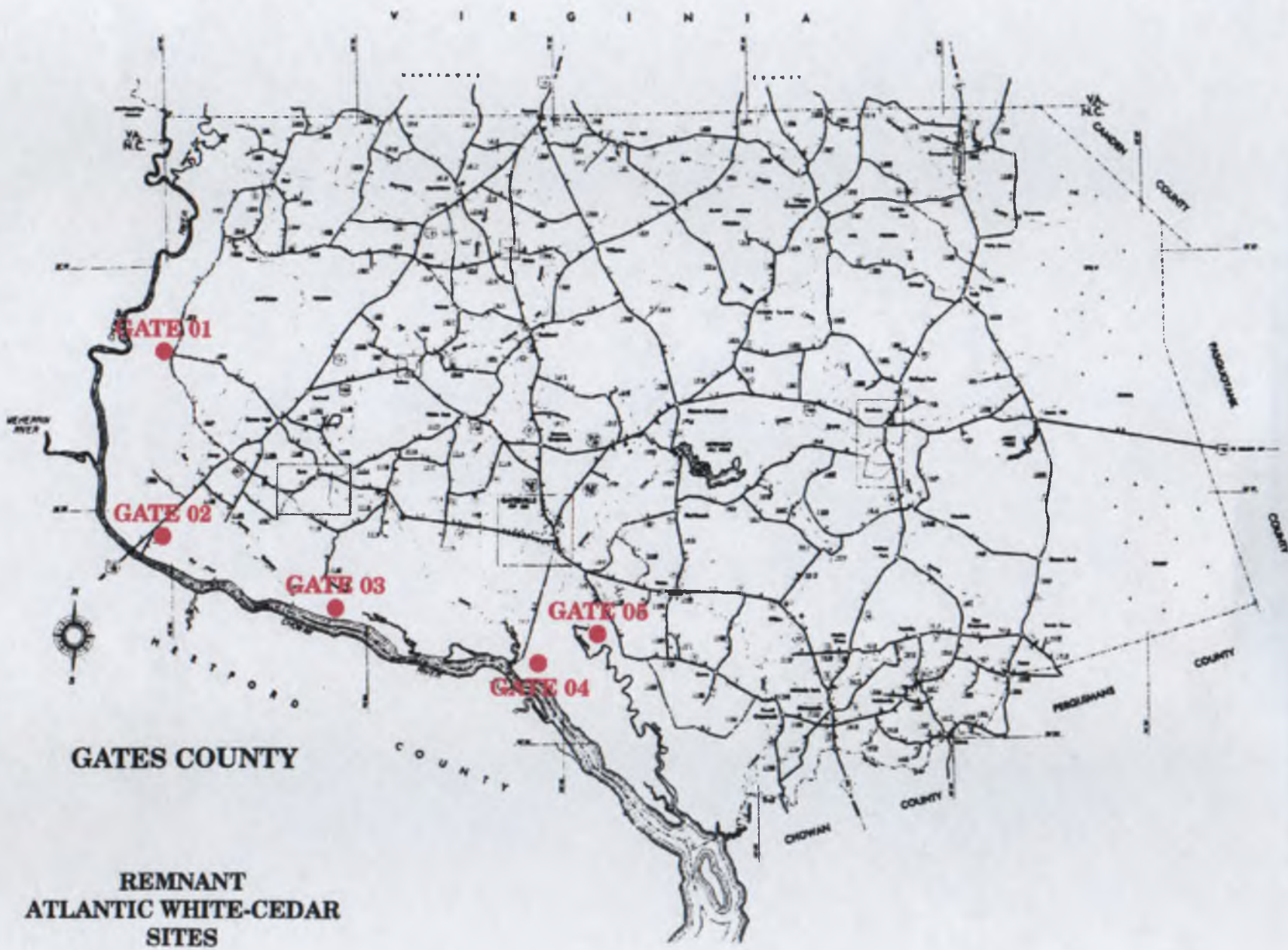
Gates County has five known AWC sites for a total AWC acreage of 151 of which one third is pure and two-thirds is mixed. All sites are located along the Chowan River and associated creeks. During the 1800s, approximately 20,000 acres of AWC existed along this northern stretch of the Chowan River (Frost 1987). Extensive logging around the turn of the century and in the 1950s coupled with lack of fire gradually reduced most of the pure AWC to mixed stands dominated by swamp black gum and red maple.

Today, known stand sizes range from <5 - 10 acres. AWC coverage varies from 20 - 80%. Four of the sites are known to be intact. In one, AWC exists mainly as remnants within or adjacent to recent clearcuts. The entire Chowan River swamp deserves further inspection, preferably from the air, to estimate the acreage in which AWC occurs as widely scattered.

Associates include loblolly pine, red maple, swamp black gum, and sweet bay. Understories typically contain highbush blueberry, titi, red bay, swamp bay, fetterbush, gallberries, blaspheme vine, greenbrier, royal fern, cinnamon fern, Virginia and netted chain-fern, and peatmoss. AWC regeneration was noted for two sites.

The major natural community type present is Nonriverine Swamp Forest. One site was described as Peatland Atlantic White Cedar. The dominant soil type is Dorovan muck with Ballahack loam present at one site.

Noteworthy sites include Sand Banks (GATE 01) and Bennetts Creek (GATE 05). GATE 01 is a 20 acre swale forest dominated by AWC and swamp black gum with tree ages to 103+; heart rot was present in several of the oldest specimens. GATE 05 contains scattered groves and stands totaling 50 acres in a swamp forest dominated by loblolly pine. Here, AWC ages range to 100 years.



Key to Remnant Atlantic White-cedar Inventory Sites - GATES COUNTY

<u>Label Number</u>	<u>Site Name</u>
GATE 01	Sand Banks
GATE 02	Shoups Landing
GATE 03	Fort Island
GATE 04	Chowan Swamp
GATE 05	Bennetts Creek

GATES COUNTY

Sand Banks- GATE 01

Site Size: 100 ac

AWC Size: 20 ac

NHP EO Code: none

Location: Western Gates County; along SR 1201 (Tinkham Road - west), approx. 0.5 mile west of SR 1200 intersection with SR 1201, and 0.75 mile east of Chowan River. Visible from road.

Description: Swale forest dominated by AWC and swamp black gum with codominant sweet bay and red maple. Understory of sweet bay, red maple, fetterbush, American holly, sweet pepperbush, highbush blueberry, and water oak. Herbs include cane, cinnamon fern, netted chain-fern, and peatmoss. Heart rot in oldest AWC.

DBH (inches): AWC : 20-22

Height (feet): AWC : 60-90

Age: AWC: 68-103+ (heart rot)

Basal Area (square feet): AWC: 60; Stand: 180; AWC coverage: 33%.

Ownership: Private

Soil: Ballahack loam

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Shoups Landing - GATE 02

Site Size: 250 ac

AWC Size: 50 ac in scattered groves

NHP EO Code: none

Location: Southwestern Gates County; scattered groves just south of US 13/158 approx. 0.25 mile north of Chowan River. Visible from highway.

Description: Mature groves dominated by AWC with codominant red maple. Understory of red maple, sweet bay, fetterbush, American holly, highbush blueberry, and blasphem vine. Herbs include Virginia chain-fern, netted chain-fern, and peatmoss. Sapling AWC regeneration in small openings.

DBH (inches): AWC: <8-10

Height (feet): AWC: 65-70

Age: AWC: 2-74

Basal Area (square feet): AWC: 230; Stand: 290; AWC coverage: 80%.

Ownership: Chowan River Forestry Foundation

Soil: Dorovan mucky peat

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

Fort Island- GATE 03

Site Size: 20 ac
AWC Size: Scattered mature trees along regeneration site
NHP EO Code: none
Location: Southwestern Gates County; approx. 0.5 mile south of SR 1120 (Fort Island Lane) and 0.5 mile north of Chowan River.
Description: Nineteen acre clearcut logged in 1989. Mature AWC trees and groves border AWC regeneration site.
DBH (inches): AWC (borders): 4-10
Height (feet): AWC (borders): 10-70
Age: AWC (borders): 10-80
Basal Area (square feet): AWC (borders): 100; Stand: 100; AWC coverage: 100%.
Ownership: Private
Soil: Dorovan mucky peat
Natural Community Type: Peatland Atlantic White Cedar
Inspection Type: Ground

Chowan Swamp- GATE 04

Site Size: 250 ac
AWC Size: 30 ac in scattered stands < 10 acres each
NHP EO Code: none
Location: Southern Gates County; approx. 2.5 miles south of Gatesville, between SR 1111 and Bennetts Creek.
Description: Mature forest dominated by swamp black gum, and loblolly pine with suppressed AWC, baldcypress, red maple, water oak. Understory of red maple, red bay, sweet pepperbush, wax myrtle, and highbush blueberry. Herbs include cane, cinnamon fern, and peatmoss.
DBH (inches): AWC: 5-8
Height (feet): AWC: 22-43
Age: AWC: 12-30
Basal Area (square feet): AWC: 35; Stand: 180; AWC coverage: 20%.
Ownership: NCSU Forestry Foundation
Soil: Dorovan mucky peat
Natural Community Type: Nonriverine Swamp Forest
Inspection Type: Ground

Bennetts Creek - GATE 05

Site Size: 150 ac

AWC Size: 50 ac

NHP EO Code: none

Location: Southern Gates County; scattered groves and stands <5 acres each approx. 1 mile south of NC 37 intersection with SR 1100, 0.5 mile east of Bennetts Creek and 0.5 mile west of SR 1100.

Description: Mature forest dominated by loblolly pine with codominant AWC. Understory of red maple, fetterbush, titi, red bay, and blaspheme vine. Herbs include royal fern and peatmoss. No sign of fire or disease. AWC is suppressed, scattered, and even-aged, with no regeneration.

DBH (inches): AWC: 10

Height (feet): AWC: 65

Age: AWC: 100

Basal Area (square feet): AWC: 20; Stand: 100; AWC coverage: 20%.

Ownership: Private

Soil: Dorovan mucky peat

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

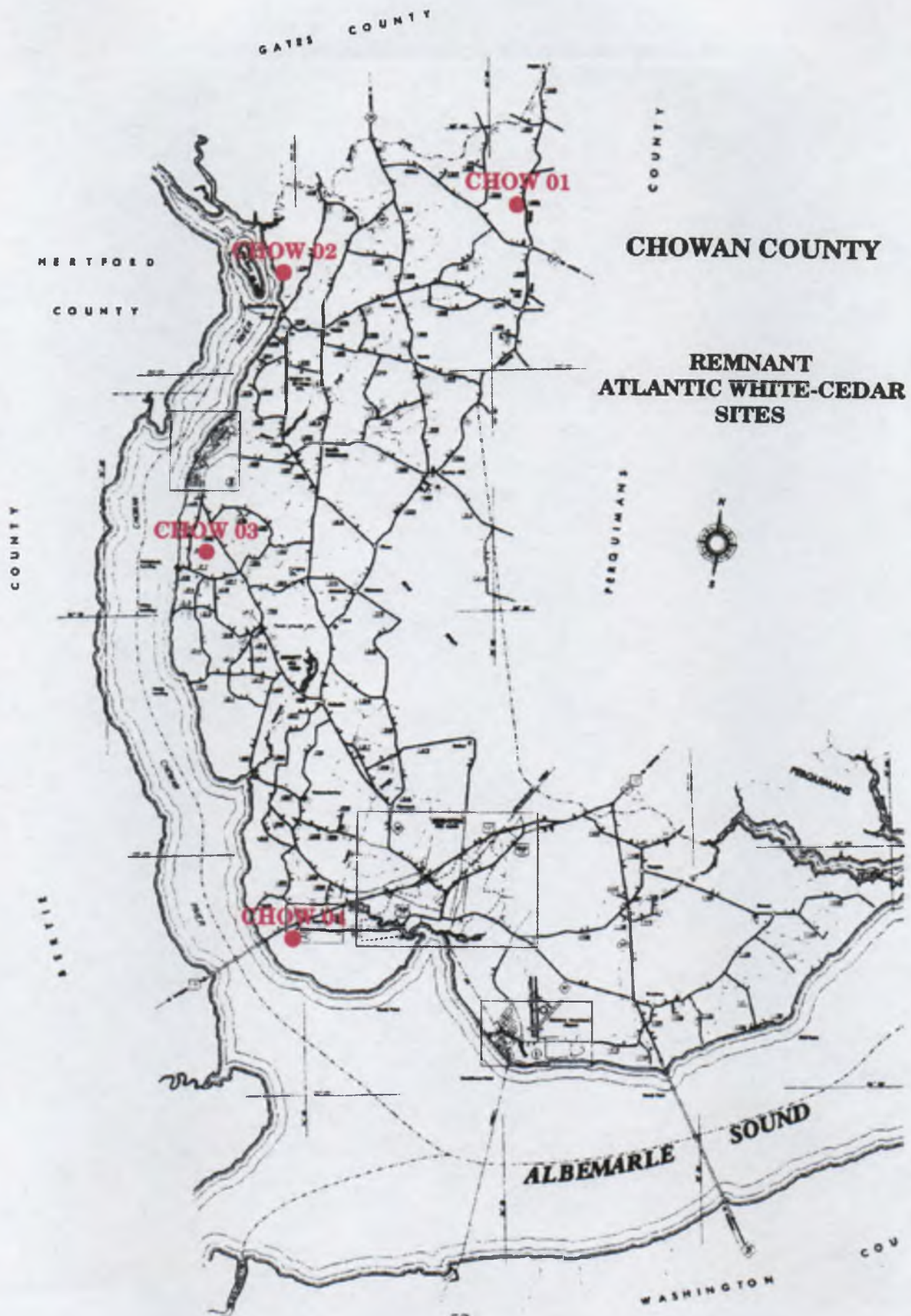
Chowan County

Chowan-County has four known AWC sites for a total AWC acreage of 19.5. Three sites are located along the Chowan River and one is north of Snow Hill near the Perquimans County line. Stand sizes range from <1 - 9 acres. All sites are mixed with AWC coverage varying from <10 - 30%. All sites are in private ownership except Gallberry Swamp (CHOW 03) which is reportedly owned by the State of North Carolina. Two of the four sites are known to be intact. AWC exists mainly as remnants within and along a recent clearcuts on one site (CHOW 02). AWC coverage on CHOW 03 is uncertain; NHP records report a 270 acre mixed forest, however, only very mixed and clearcut stands were obvious during ground inspections. The entire Chowan River swamp deserves further inspection, preferably from the air.

Associates include loblolly pine, red maple, sweet bay, and loblolly bay. Understories typically contain highbush blueberry, titi, red bay, swamp bay, fetterbush, gallberries, blaspheme vine, greenbrier, royal fern, cinnamon fern, and Virginia and netted chain-fern. AWC regeneration was noted in small wet pockets on the Chowan River site (CHOW 04) .

The sole natural community type present is Nonriverine Swamp Forest. Dominant soil types include Dorovan and Scuppernong mucks.

No visited stands were noteworthy.



Key to Remnant Atlantic White-cedar Inventory Sites - CHOWAN COUNTY

<u>Label Number</u>	<u>Site Name</u>
CHOW 01	Snow Hill
CHOW 02	Cannon Ferry
CHOW 03	Gallberry Swamp
CHOW 04	Chowan River

CHOWAN COUNTY

Snow Hill - CHOW 01

Site Size: 20 ac
AWC Size: 16 ac; 8 stands and groves; 7 grove approx. 1 ac each, 1 stand 9 ac
NHP EO Code: none
Location: Northeastern Chowan County; approx. 1 mile north of NC 37, 0.5 mil east of SR 1300 and west of SR 1002.
Description: Scattered pockets of forest dominated by red maple with codominants AWC and sweet bay. Understory of highbush blueberry, titi, red bay, swamp bay, fetterbush, American holly, sweet gallberry, common greenbrier, and blaspheme vine. Herbs include cinnamon fern and netted chain-fern. No sign of fire or disturbance. No stumps. No AWC regeneration. Dense AWC saplings along canal. Largest AWCs have heart rot.
DBH (inches): AWC: 6-26
Height (feet): AWC: 30-78
Age: AWC: 15-70+ (heart rot)
Basal Area (square feet): AWC: 30; Stand: 100; AWC coverage: variable to 30%.
Ownership: Private
Soil: Scuppernon muck
Natural Community Type: Nonriverine Swamp Forest
Inspection Type: Ground

Cannon Ferry - CHOW 02

Site Size: 15 ac
AWC Size: < 1 ac; recently logged
NHP EO Code: none
Location: Northwestern Chowan County; approx. 0.5 mile north of Cannon Ferry between Chowan River and SR 1232.
Description: Recently clearcut 20 acre stand. Scattered groves of AWC around perimeter of cut.
DBH (inches): AWC: 12-17
Height (feet): AWC: 40-55
Age: AWC: 103
Basal Area (square feet): N/A
Ownership: Private
Soil: Dorovan muck
Natural Community Type: Nonriverine Swamp Forest
Inspection Type: Ground

Gallberry Swamp - CHOW 03

Site Size: 270 ac

AWC Size: unk

NHP EO Code: 00625*013

Location: Western Chowan County; approx. 0.5 mile west of Rocky Hock, north of SR 1217, west of SR 1222 and east of SR 1218.

Description: Carolina bay with shallow peat deposits. Nearly closed canopy dominated by red maple, swamp black gum, loblolly pine, and AWC. Shrub layer of sweet pepperbush, titi, inkberry, and common greenbrier.

DBH (inches): AWC: unk

Height (feet): AWC: unk

Age: AWC: unk

Basal Area (square feet): unk

Ownership: Public (NC Department of Administration; unallocated State land)

Soil: Scuppernong muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: NHP files; site not visited for this report.

Chowan River - CHOW 04

Site Size: < 5 ac

AWC Size: < 5 ac

NHP EO Code: none

Location: Southern Chowan County; approx. 1.5 miles east of Chowan River, 0.5 mile south of US 17 and 0.25 mile west of US 17 Business.

Description: Small stand of AWC within loblolly pine woodland. Open canopy dominated by loblolly pine with codominant AWC, red maple, and loblolly bay. Understory of swamp bay, red bay, sweet gallberry, fetterbush, sweet bay, and blasphemous vine. Herbs include cane and cinnamon fern. AWC regeneration (1-3 years) in small wet openings.

DBH (inches): AWC: 8-9

Height (feet): AWC: 35-42

Age: AWC: 28-36

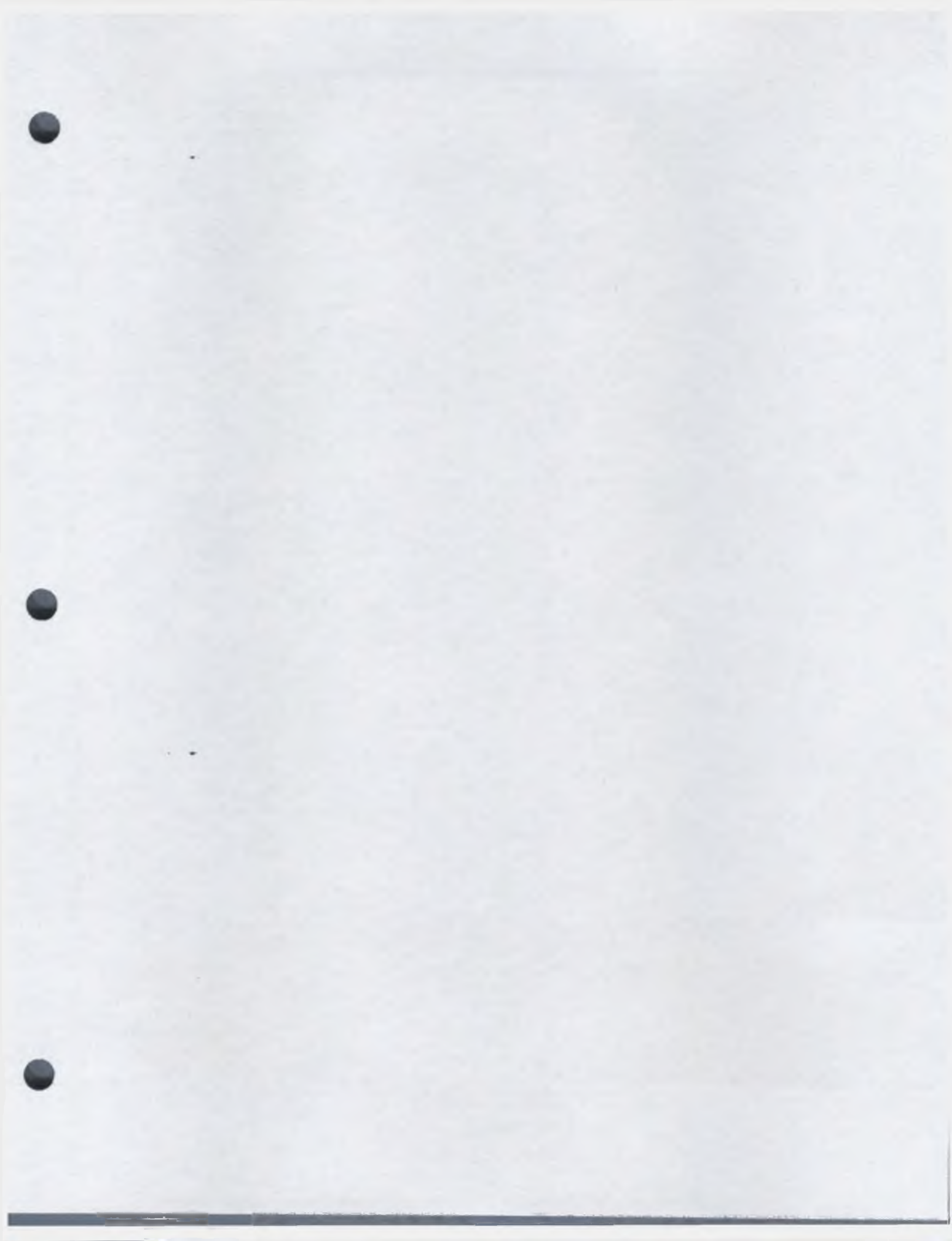
Basal Area (square feet): AWC: 30; Stand: 150; AWC coverage: variable to 20%.

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground



Washington County

Washington County has four known AWC sites for a total AWC acreage of 365. The sites are located mainly along Bull Bay, Conaby Creek, and Welch Creek with stand sizes ranging from 5 - 90 acres. The majority of the sites are considered pure with AWC coverage varying from <10 - 95%. Sixty percent is publicly owned. Aerial inspection was used in addition to ground checks on two of the sites. Three of the four sites are intact; AWC exists mainly as remnants within and along recent clearcuts on one site (WASH/BEAU 04). AWC could be very widely scattered in areas not surveyed around Deep Creek and south of the Tidewater Agriculture Research Station.

Associates include loblolly and pond pine, red maple, sweet bay, baldcypress, and swamp black gum. Understories typically contain fetterbush, gallberries, red and swamp bay, highbush blueberry, evergreen bayberry, titi, sweet pepperbush, blaspheme vine, greenbrier, royal fern, cinnamon fern, Virginia and netted chain-fern, and peatmoss. Sixty acres of regenerating AWC was noted within or adjacent to stands on the Bull Neck Swamp site (WASH 01).

Natural community types include Peatland Atlantic White Cedar and Nonriverine Swamp Forest with substantial transitioning between the two.

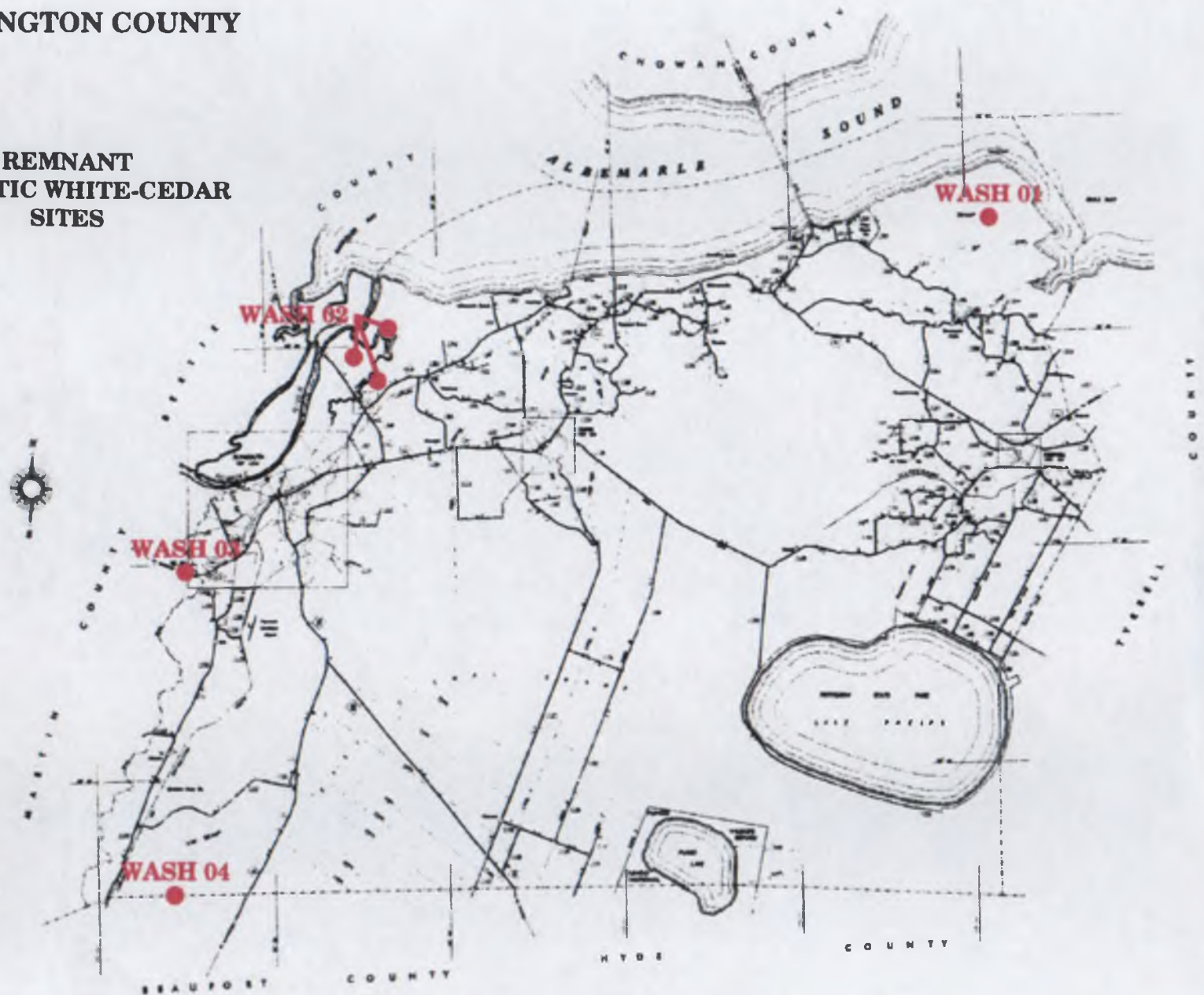
The dominant soil type is Dorovan muck; Belhaven and Pungo mucks were present at one site.

Noteworthy sites include Bull Neck Swamp (WASH 01) and Conaby Creek/Roanoke River Swamp (WASH 02). WASH 01, owned by North Carolina State University, contains approximately 220 acres of mature AWC in seven stands ranging from 10 - 80 acres in size with AWC coverage varying from <10 - 70%. Inspection by Lynch and Peacock (1982) indicated the AWC occurs on a partially buried sandridge overlain by shallow peat, the remains of a fluvial ridge and swale system. WASH 02 contains 133 acres over 4 stands ranging from 5 - 90 acres in size with AWC coverage from 10 - 76%.

WASHINGTON COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES

-58-



Key to Remnant Atlantic White-cedar Inventory Sites - WASHINGTON COUNTY

Label Number

Site Name

WASH 01

Bull Neck Swamp

WASH 02

Conaby Creek/Roanoke River Swamp

WASH 03

Welch Creek

WASH/BEAU 04

Van Swamp

WASHINGTON COUNTY

Bull Neck Swamp - WASH 01

Site Size: 400 ac

AWC Size: 220 acres; 7 stands; stand acreage ranges from 10 - 80 ac; 2 stands are 10 acres each, 1 stand 11 acres, 1 stand 14 acres, 1 stand 47 acres, 1 stand 48 acres, 1 stand 80 acres.

NHP EO Code: none

Location: Northern Washington County; east of SR 1302 and west of Bull Bay. Some sites accessible from ground by entering general area at Deep Creek Landing; contact NCSU for gate key.

Description: AWC coverage ranges from 10% - >70%. In ground visited stand, canopy dominated by AWC (65%) and loblolly pine with codominant red maple and sweet bay. Understory of swamp bay, sweet bay, red maple, sweet gallberry, and common greenbrier. Additional 60 acres of regenerating AWC; height 10-20 feet; age 10-15 years; coverage 10 - 80%.

DBH (inches): AWC (Representative): 10-14, loblolly pine: 9-12

Height (feet): AWC (Representative): 45-75, loblolly pine: 70

Age: AWC (Representative): 43-95, loblolly pine: 53

Basal Area (square feet): AWC: 160, Stand: 245; AWC Overall Coverage: <10-70%.

Ownership: Public - NCSU

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and Aerial

Conaby Creek/Roanoke River Swamp - WASH 02

Site Size: 500 ac

AWC Size: 133 acres; 4 stands; 1 stand 5 acres, 1 stand 8 acres, 1 stand 30 acres, 1 stand 90 acres.

NHP EO Code: 00645*011

Location: Northwestern Washington County; north of NC 308 and east of NC 45, east and west of Conaby Creek, south of Roanoke River. Some sites accessible from ground along NC 308 between NC 45 and SR 1324.

Description: Estimated AWC acreage includes stands with AWC coverage ranging from 10% - >70%. In ground visited stands, canopy dominated by AWC (50-76%) and swamp black gum with codominant red maple and sweet bay and scattered pond pine. Understory of swamp bay, sweet gallberry, titi, and common greenbrier. Herbs include cinnamon fern, netted chain-fern, and peatmoss.

DBH (inches): AWC: 12-23, swamp black gum: 12-13

Height (feet): AWC: 52-60, swamp black gum: 50-60

Age: AWC: 64-154, swamp black gum: 93

Basal Area (square feet): AWC: 60-190, Stand: 125-215; AWC Coverage: 10% - 76%.

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and Aerial

Welch Creek - WASH 03

Site Size: 20 ac

AWC Size: 10 acres; 2 stands; north stand 5 acres, south stand 5 acres.

NHP EO Code: none

Location: Western Washington County; at US 64 intersection with Welch Creek. North site visible from US 64 just north of auto shop. South site along east side of Welch Creek just south of US 64.

Description: North side canopy dominated by AWC (95%) with scattered loblolly pine. Codominant red maple. Understory of swamp bay, red bay, sweet gallberry, American holly, titi, evergreen bayberry, and blaspheme vine. Herbs include cinnamon fern and peatmoss. South site dominated by swamp black gum, red maple, and loblolly pine with suppressed and scattered AWC. Understory of swamp bay, red bay, red maple, sweet gallberry, American holly, and blaspheme vine. Open canopy.

DBH (inches): North - AWC: 15-19, loblolly pine: 14-16

South - AWC: 3-8

Height (feet): North - AWC: 65-75, loblolly pine: 80

South - AWC: 35

Age: North - AWC: 89-108, loblolly pine: 71

South - AWC: 20-30

Basal Area (square feet): North - AWC: 270, Stand: 280; AWC Coverage: 95%.

South - AWC: 10, Stand: 150; AWC Coverage: 5%

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar and Nonriverine Swamp Forest

Inspection Type: Ground

Van Swamp - WASH/BEAU 04

Site Size: 100 ac

AWC Size: < 10 acres; scattered trees in recent cutover

NHP EO Code: 00625*022

Location: Southwestern Washington County and northwestern Beaufort County; approx. 1.5 miles west of NC 32 adjacent at Washington County - Beaufort County line. Follow SR 1101 (Hollis Road) west to first logging road. Drive south, fork to southwest and continue south to county line. Remnants just north of county line along road.

Description: Approx. 185 acres of Van Swamp that were recently logged appear to have had AWC in the canopy along with loblolly pine and red maple prior to the cutting. No intact stands were located. Remnant AWC present along logging road and widely scattered within cutover (< 10% coverage). Cutovers regenerating in swamp bay, red bay, red maple, loblolly pine, and scattered loblolly bay.

DBH (inches): AWC: 7-12

Height (feet): AWC: 35-50

Age: AWC: 27-48

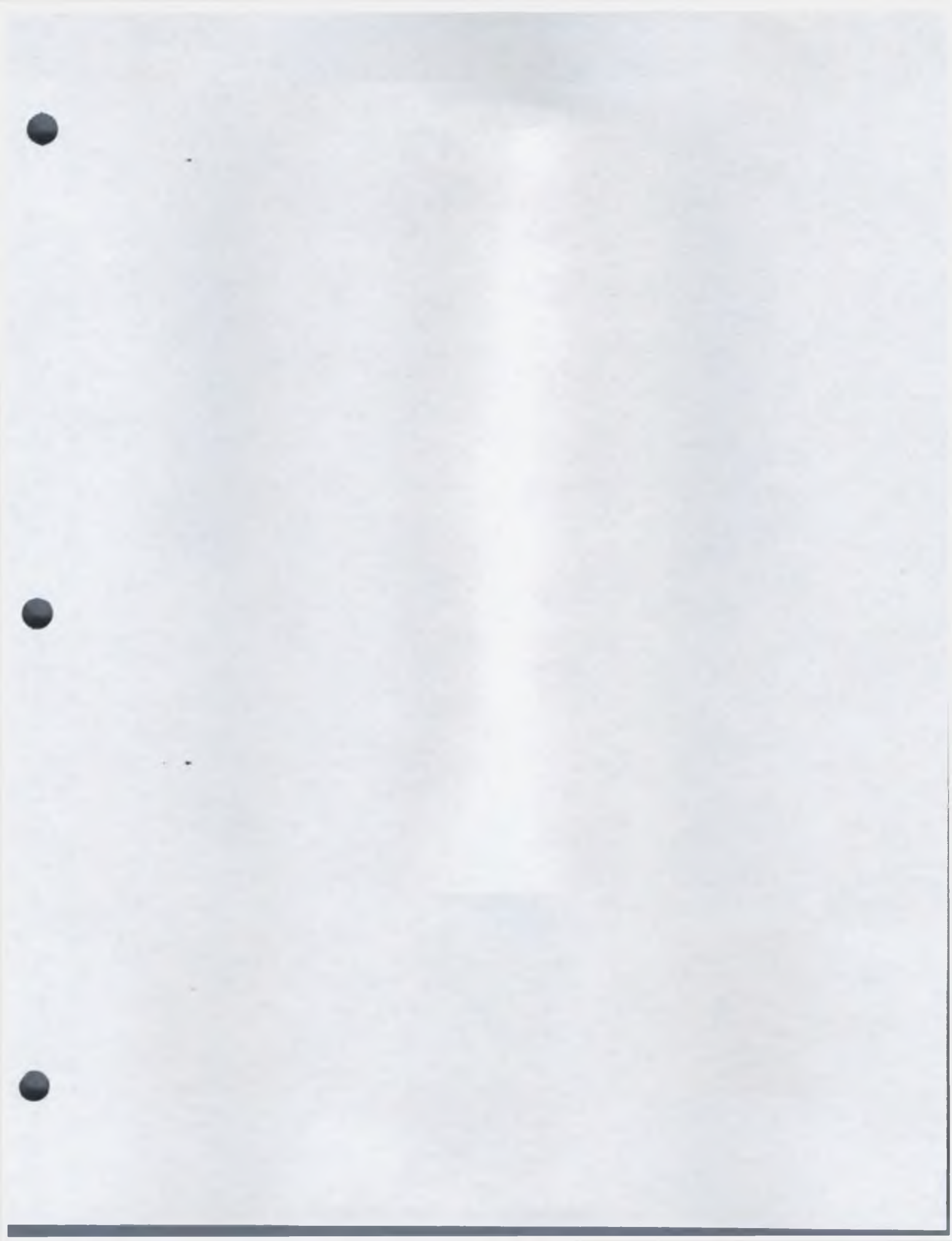
Basal Area (square feet): N/A; AWC Coverage < 10%

Ownership: Private

Soil: Pungo and Belhaven mucks

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground and NHP files.



Tyrrell County

Tyrrell County has eleven known AWC sites; several of which contain numerous stands or stand clusters for a total AWC acreage of 1358, representing 13% of the remnant AWC acreage in North Carolina. The sites are located mainly along the Alligator and Scuppernong Rivers and associated creeks with stand sizes ranging from 0.1 - 75 acres. Five percent of the AWC acreage is considered mixed while 95% is pure. Sixty percent is in private ownership with the remainder owned by the U.S. Fish and Wildlife Service (Pocosin Lakes NWR). Aerial inspection was used solely on two sites; it was also used in addition to ground checks on another two.

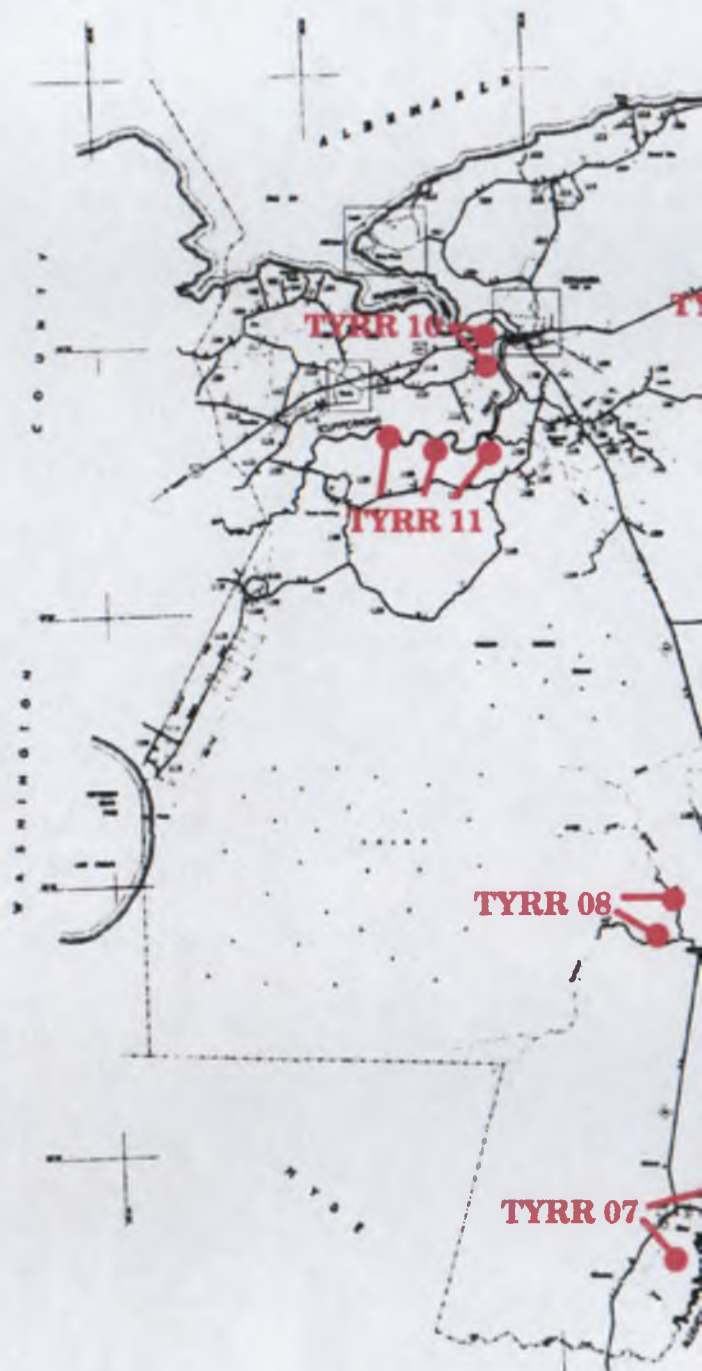
Associates include loblolly and pond pine, red maple, sweet bay, baldcypress, and swamp black gum. Understories typically contain fetterbush, gallberries, red and swamp bay, highbush blueberry, evergreen bayberry, blaspheme vine, greenbrier, Walter's greenbrier, royal fern, cinnamon fern, Virginia and netted chain-fern, and peatmoss. AWC regeneration was noted within or immediately adjacent to seven sites.

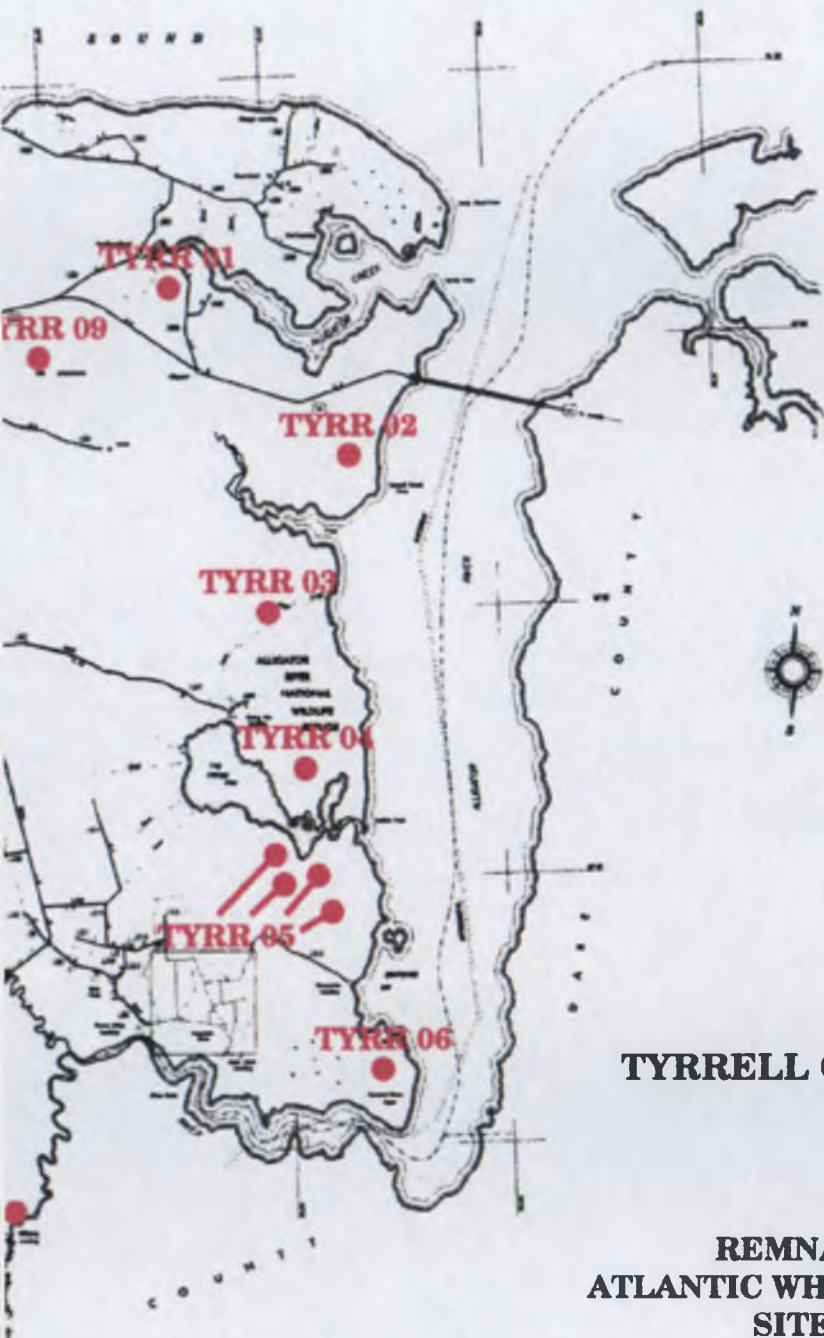
Natural community types include Peatland Atlantic White Cedar and Nonriverine Swamp Forest with substantial transitioning between the two.

Major soil types include Pungo and Dorovan mucks; Tomotley fine sandy loam was present at one site.

All Tyrrell County sites are comparatively noteworthy with regards to acreage and AWC dominance. The oldest trees, 96 and 81 years respectively, occur on the Goose Creek site (TYRR 03) and the Scuppernong River Swamp Forest (TYRR 10). The most discrete Peatland Atlantic White Cedar communities occur within the curves of the South Fork of the Scuppernong River (TYRR 11A-C), where at least five very pure AWC stands are easily discernible. These stands contain mature and young trees with scattered fallen old growth. According to one landowner, no largescale logging has taken place within these stands for at least 65 years. General site characteristics are described in Moore and Carter (1987).

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TYRRELL COUNTY

REMNANT
ATLANTIC WHITE-CEDAR
SITES

Key to Remnant Atlantic White-cedar Inventory Sites - TYRRELL COUNTY

<u>Label Number</u>	<u>Site Name</u>
TYRR 01	West Alligator Creek
TYRR 02	Second Creek
TYRR 03	Goose Creek
TYRR 04	Northeast Frying Pan
TYRR 05	Southeast Frying Pan
TYRR 06	Buck Island
TYRR 07	Upper Alligator River and Marshes
TYRR 08	Upper Alligator River Pocosin
TYRR 09	Riders Creek
TYRR 10	Scuppernong River Swamp Forest
TYRR 11	Scuppernong River South

TYRRELL COUNTY

West Alligator Creek - TYRR 01

Site Size: 150 ac

AWC Size: 75 ac; 3 stands less than 10 acres each, 1 stand 63 acres

NHP EO Code: none

Location: Northeastern Tyrrell County, 0.5 mile south of Newfoundland. Access at bridge over Alligator Creek east of Newfoundland on SR 1229, walk SSE to stands.

Description: Four stands south of Alligator Creek headwaters. Canopy of mature AWC, red maple and pond pine with codominant swamp black gum. Dense understory of red bay, swamp bay, fetterbush, sweet gallberry, inkberry, and highbush blueberry. No sign of disturbance or fire. Very wet.

DBH (inches): AWC: 7-12, pond pine: 10

Height (feet): AWC: 35-42

Age: AWC: 64, pond pine: 40

Basal Area (square feet): AWC: 70, Stand: 205; AWC coverage: 30%

Ownership: Private

Soil: Dorovan and Pungo mucks

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Second Creek - TYRR 02

Site Size: 200 ac

AWC Size: 105 ac; 9 stands; 5 stands less than 6 acres each, 1 stand 10 acres, 1 stand 11 acres, 1 stand 23 acres, 1 stand 43 acres.

NHP EO Code: none

Location: Northeastern Tyrrell County between US 64 and Second Creek, mostly east of first gated road west of Alligator River bridge. Walk 0.5 miles south on private road, AWC stands mostly on east side of road, parallel to road edge.

Description: Nine stands north of Second Creek and northwest of Second Creek Point. Canopy of AWC and swamp black gum with codominants sweet bay, loblolly pine, and red maple. Dense understory of red bay, fetterbush, sweet gallberry, inkberry, and blaspheme vine. Herbs include various ferns and peatmoss. No sign of disturbance or fire. Some AWC regeneration in small openings (DBH < 4 inches). Many snags and downed logs.

DBH (inches): AWC: 6-11, swamp black gum: 8-9

Height (feet): AWC: 45-50

Age: AWC: 45-101, swamp black gum: 34-72

Basal Area (square feet): AWC: 65-155, Stand: 100-315; AWC overall coverage: 60%

Ownership: Private

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

Goose Creek - TYRR 03

Site Size: - 14 ac

AWC Size: 14 ac; 1 stand.

NHP EO Code: none

Location: Eastern Tyrrell County along Goose Creek approx. 1 mile west of Alligator River; follow SR 1307 (Frying Pan Road) east and turn north on Canal Road 0.5 mile west of Frying Pan Landing. At fork, turn right, then turn left after pump house. Stand visible after 0.5 miles; boat across canal and walk into stand.

Description: One stand on northwest side of Goose Creek. Canopy of AWC, loblolly pine, and sweet bay. Understory of red bay, fetterbush, sweet gallberry, bayberry, sweet bay, blaspheme vine, highbush blueberry. Herbs include various ferns and peatmoss. No sign of disturbance or fire. Open canopy. Hummocks. Some AWC regeneration in small openings (DBH < 3 inches).

DBH (inches): AWC: 10-16, loblolly pine: 8-9

Height (feet): AWC: 45-50, loblolly pine: 53

Age: AWC: 58-96, loblolly pine: 52

Basal Area (square feet): AWC: 110, Stand: 220; AWC coverage: 50%

Ownership: Public (USFWS - Pocosin Lakes NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

Northeast Frying Pan - TYRR 04

Site Size: 350 ac

AWC Size: 14 stands with 210 ac total; stand acreage ranges from 2 - 75 ac; 8 stands are 10 acres or less each, 1 stand 10 acres, 1 stand 12 acres, 1 stand 20 acres, 1 stand 25 acres, 1 stand 28 acres, 1 stand 75 acres.

NHP EO Code: none

Location: Eastern Tyrrell County; east of SR 1308, 0.5 mile north of The Frying Pan between Frying Pan Landing and the Alligator River.

Description: Swamp peat deposits west of Alligator River. Canopy dominated by AWC (60%) and loblolly pine with codominants red maple and sweet bay. Dense understory of sweet gallberry, inkberry, fetterbush, highbush blueberry, and common greenbrier. Dense peatmoss. Few snags, little slash. No sign of fire or other disturbance. Scattered AWC regeneration; height > 10 feet.

DBH (inches): AWC: 12-18

Height (feet): AWC: 45

Age: AWC: 93

Basal Area (square feet): AWC: 150; Stand: 250; AWC coverage: 60%

Ownership: Public (USFWS - Pocosin Lakes NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and Aerial

Southeast Frying Pan - TYRR 05

Site Size: 200 ac
AWC Size: 6 stands with 50 ac total; stand size estimated at 5 - 12 acres each.
NHP EO Code: none
Location: Southeastern Tyrrell County; northeast of SR 1314 and southeast of The Frying Pan, 0.5 mile west of the Alligator River.
Description: Swamp peat deposits west of Alligator River. Canopy dominated by mature AWC and pine. AWC density ranges from pure to widely scattered with pine and mixed hardwoods.. Stands surrounded by vast clearcuts largely regenerating in AWC.
DBH (inches): AWC: mature
Height (feet): AWC: mature
Age: AWC: mature
Basal Area (square feet): AWC coverage: 10% - >70%
Ownership: Private
Soil: Pungo muck
Natural Community Type: Peatland Atlantic White Cedar
Inspection Type: Aerial

Buck Island - TYRR 06

Site Size: 170 ac
AWC Size: 6-8 stands with 50 ac total
NHP EO Code: none
Location: Southeastern Tyrrell County; east of N-S logging road on Buck Island, southeast of Rattlesnake Bay, 0.25 mile west of the Alligator River.
Description: Swamp peat deposits west of Alligator River. Scattered 2-10 acre stands dominated by mature AWC and pine. AWC density ranges from pure to widely scattered with pine and mixed hardwoods.
DBH (inches): AWC: mature
Height (feet): AWC: mature
Age: AWC: mature
Basal Area (square feet): AWC coverage: 10% - >70%
Ownership: Private
Soil: Pungo muck
Natural Community Type: Peatland Atlantic White Cedar
Inspection Type: Aerial

Upper Alligator River Marshes and Forests - TYRR 07

Site Size: - 600 ac

AWC Size: 395 ac; 22 groves and stands from 0.1 - 70 ac each; 14 groves and stands are less than 5 acres each, 1 stand 15 acres, 1 stand 20 acres, 1 stand 40 acres, 1 stand 45 acres, 1 stand 50 acres, 2 stands 60 acres, and 1 stand 75 acres.

NHP EO Code: 00625*029

Location: Southern Tyrrell County; east of NC 94; north of IAWW, north and south of Kilkenny Landing.

Description: Scattered groves and stands dominated by mature AWC, baldcypress and pine. Understory of red maple, scattered water oak, fetterbush, sweet gallberry, inkberry, swamp bay, red bay, bayberry, highbush blueberry, sweet bay, and blaspheme vine. Dense peatmoss. AWC density ranges from pure to widely scattered with pine, mixed hardwoods, and pocosin shrubs. Scattered AWC regenerating in adjacent clearcuts.

DBH (inches): Representative Stand: AWC: 5-14, baldcypress: 25, loblolly pine: 6-10

Height (feet): Representative Stand: AWC: 40

Age: Representative Stand: AWC: 70, baldcypress: 75 - 170

Basal Area (square feet): AWC: 200, Stand: 275; AWC coverage: 10% - > 70%

Ownership: Public (USFWS - Pocosin Lakes NWR) and Private (TNC and others)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar and Nonriverine Swamp Forest

Inspection Type: Ground and Aerial, NHP Files

Upper Alligator River Pocosin - TYRR 08

Site Size: 250 ac

AWC Size: 50 ac; 7 stands from 3 - 23 acres each

NHP EO Code: 00625*032

Location: Western Tyrrell County; northwest of NC 94 bridge over Northwest Fork, south of Hollow Ground Swamp..

Description: Six stands along Northwest Fork and one along Southwest Fork accessible from water. Fairly open canopy of mature AWC, baldcypress, swamp black gum, red maple and loblolly pine.. Understory of wax myrtle, fetterbush, sweet gallberry, inkberry, swamp bay, and Walter's common greenbrier. Dense peatmoss.

DBH (inches): AWC: 9-16, baldcypress: 8-13, loblolly pine: 10-12

Height (feet): AWC: 35-55

Age: AWC: 45-75, baldcypress: 75-110

Basal Area (square feet): AWC: 115, Stand: 215; AWC coverage: 50%

Ownership: Public (USFWS - Pocosin Lakes NWR)

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground, NHP Files

Riders Creek - TYRR 09

Site Size: 500 ac

AWC Size: 188 ac; 5 stands; 1 stand 17 acres, 1 stand 18 acres, 1 stand 19 acres, 1 stand 52 acres, 1 stand 82 acres. Additional 125 acres of regenerating AWC.

NHP EO Code: none

Location: Northeastern Tyrrell County approx 6 miles east of Columbia; east of Riders Creek headwaters and 1-2 miles south of US 64; stands north and south of timber road W-15. Access by contacting Land Manager.

Description: Second growth from mid 1950s logging by Richmond Cedar Works. Subsequently owned by Westvaco, First Colony Farms, and others. Currently under forest management plan.. Three stands (169 ac) considered mainly sawtimber AWC. 2 stands (19 ac) considered AWC and pond pine mixed sawtimber with codominant red maple, swamp black gum, and baldcypress. Understory of fetherbush, inkberry, sweet gallberry, sweet bay, and red bay. Additional 5 stands (125 ac) of regenerating AWC (DBH <7).

DBH (inches): AWC: 7-8+, pond pine: 6-14

Height (feet): AWC: 46-57

Age: AWC: 40+

Basal Area (square feet): Sawtimber AWC: 74-129, Stand: unk
AWC overall coverage: 50%

Ownership: Private

Soil: Dorovan muck, Tomotley fine sandy loam

Natural Community Type: Peatland Atlantic White Cedar and Nonriverine Swamp Forest

Inspection Type: Land Manager files

Scuppernong River Swamp Forest (Bell Tract) - TYRR 10

Site Size: 100 ac

AWC Size: 72 ac; 2 stands; south stand 12 acres, north stand 60 acres

NHP EO Code: 00645*012

Location: Northwestern Tyrrell County on north and south sides of US 64 approx. 0.5 mile west of Columbia. Access by foot, avoiding ditch along south side of US 64.

Description: Two stands north and south of US 64. Canopy dominated by AWC with codominant red maple, swamp black gum, sweetgum, loblolly pine, and an occasional water tupelo. Understory of red bay, fetherbush, sweet gallberry, blaspheme vine, Walter's common greenbrier, and sweet gallberry. Herbs include cinnamon fern and peatmoss. No sign of disturbance or fire. Some AWC regeneration in small openings (DBH <4 inches).

DBH (inches): AWC: 6-24, loblolly pine: 10-22, swamp black gum: 10-15

Height (feet): AWC: 50-62

Age: AWC: 72-81

Basal Area (square feet): North - AWC: 90, Stand: 270
South - AWC: 330, Stand: 355
AWC overall coverage: 30-90%

Ownership: Private (TNC)

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground, NHP files

Scuppernong River South - TYRR 11 (A-C)

Site Size: 1000 ac

AWC Size: 180 ac; A: 1 39 acre stand; B: 1 39 acre stand and 1 14 acre stand; C: 1 37 acre stand and 1 50 acre stand.

NHP EO Code: none

Location: Northwestern Tyrrell County along Scuppernong River, approx 0.5 - 4 miles southwest of Columbia. Access by boat from Scuppernong River. Most stands are 200-300 feet beyond river bank.

TYRR 11A

Description: Canopy dominated by AWC with codominant swamp black gum, red maple, and loblolly pine. Understory of sweet gallberry, inkberry, American holly, fetterbush, bayberry, highbush blueberry, red bay, swamp bay, swamp dog hobble, and sweet bay. Herbs include cinnamon fern and peatmoss.

DBH (inches): AWC: 10-13

Height (feet): AWC: 60-65

Age: AWC: 56-69

Basal Area (square feet): AWC: 170, Stand: 245; AWC overall coverage: 70%

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

TYRR 11B

Description: Canopy dominated by AWC with codominant swamp black gum, red maple, and sweet bay. Understory of red maple, swamp black gum, sweet bay, sweet gallberry, inkberry, fetterbush, swamp bay, and titi. Herbs include cinnamon fern and peatmoss. Some AWC regeneration on edge of stand. Some AWC disease present - trunks rotting at base.

DBH (inches): AWC: 10-15

Height (feet): AWC: 50-55

Age: AWC: 50

Basal Area (square feet): AWC: 265, Stand: 325; AWC overall coverage: 80%

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

TYRR 11C

Description: Canopy dominated by AWC with codominant swamp black gum, red maple, and sweet bay. Understory of red maple, sweet bay, sweet gallberry, inkberry, fetterbush, swamp bay, and titi. Herbs include cinnamon fern and peatmoss. Some AWC disease present - trunks rotting at base.

DBH (inches): AWC: 10-13

Height (feet): AWC: 55-60

Age: AWC: 40-45

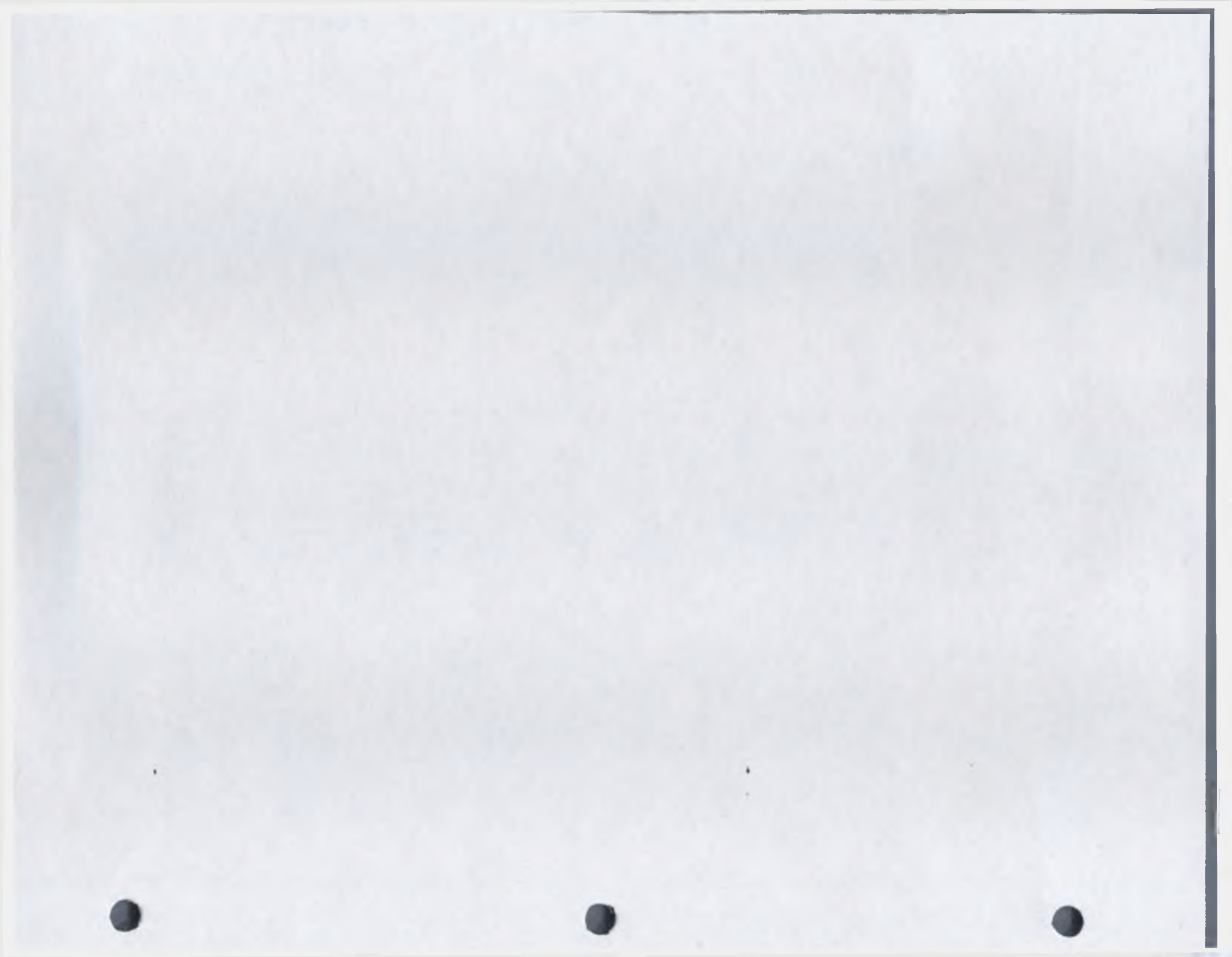
Basal Area (square feet): AWC: 265, Stand: 305; AWC overall coverage: 85%

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground



Dare County

Dare County has 19 known AWC stand cluster sites for a total acreage of 5976. With 56.5% of the statewide acreage, Dare County ranks first of the 31 counties in regards to AWC abundance. All of the Dare acreage occurs on public land; 62.5% occurs on Alligator River NWR and 37.5% on the U.S. Air Force DCR. Pure and widely scattered acreage each account for 47.5% of the total while mixed acreage accounts for 5%. Stand and stand cluster sizes range from 2-550 acres; AWC coverage varies from <10-100%.

The Alligator River NWR sites are generally located within 2.5 miles of the Alligator River and in the vicinity of Milltail Creek and Sawyer Lake. One site is approximately 4 miles east of Milltail Creek and 4 miles west of the Croatan Sound. Several of the sites consist of numerous stand clusters for which data was compiled according to Refuge delineations that were confirmed and/or modified with aerial inspection. The DCR sites are mainly within 5 miles of the Alligator River and west of the Air Force impact area; one is just west of the Navy impact area. DCR data was collected as described in the Study Methods section and during a timber cruise conducted by Daniels Consulting Forestry in 1996-97.

Associates include loblolly and pond pine, baldcypress, red maple, swamp black gum, and loblolly bay. Understories include swamp and red bay, fetterbush, swamp doghobble, sweet pepperbush, titi, dangleberry, sweet gallberry, inkberry, wax myrtle, evergreen bayberry, high-bush blueberry, blackberries, possumhaw, Virginia creeper, poison ivy, common greenbrier, blaspheme vine, Walter's greenbrier, and muscadine. Herbs include cane, royal and cinnamon ferns, netted and Virginia chain-ferns, partridgeberry, white-flowered arum, and peatmosses.

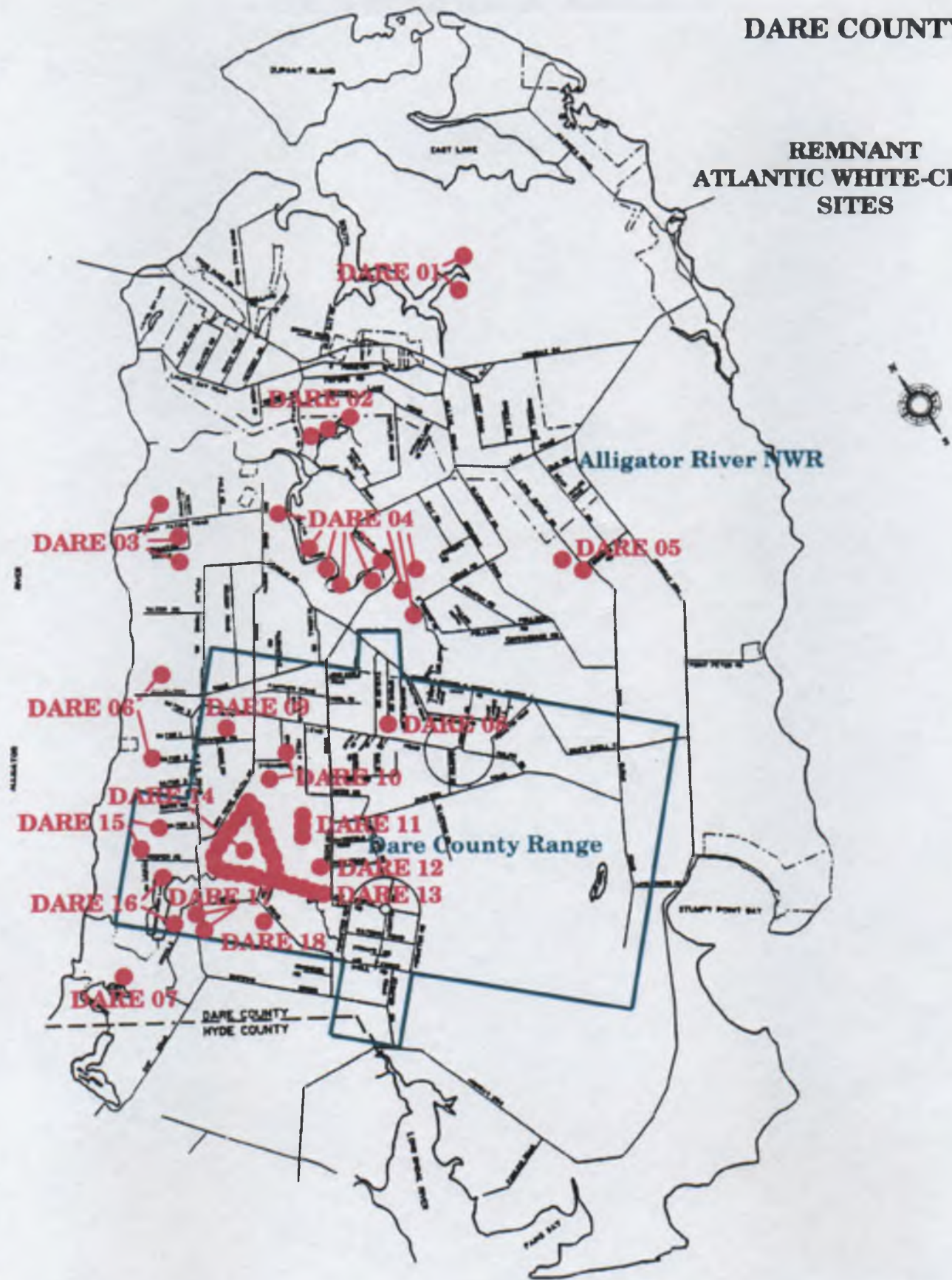
The combined Refuge and DCR regeneration acreage is approximately 10,000; AWC stocking varies from very widely scattered to nearly pure (Tom Eagle, pers. comm.). For further information, review Smith (1995).

The natural community types present in descending order of acreage are Peatland Atlantic White Cedar, Nonriverine Swamp Forest and Bay Forest. The Dare County sites are part of an expansive peatland mosaic and, as such, there is substantial transitioning from one type to the next within most areas. Although no sites are classified as Pond Pine Woodland, their ecotones could be. The soil types present include Pungo, Belhaven, Roper, and Ponzer mucks and Hyde loam.

Several of the 19 sites are noteworthy; compared with sites statewide, all are noteworthy because of their size and/or composition. On Alligator River NWR, the most noteworthy site is ARNWR Central (DARE 04), a 1972 acre site that consists of 872 acres of pure AWC and 1100 acres of widely scattered AWC along a five mile stretch of Milltail Creek. Also exceptional is Grassy Patch Road (DARE 03) which contains 436 acres of pure, 35 acres of mixed, and 550 acres of widely scattered AWC in the Grassy Patch and Gator Roads vicinity. On the DCR, noteworthy sites include Beechland Central (DARE 11), a 725 acre pure site located west of Beechland Road, and the northern portion of Sycamore Road (DARE 10), an easily accessible 44 acre pure stand.

DARE COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - DARE COUNTY

<u>Label Number</u>	<u>Site Name</u>
Alligator River NWR	
DARE 01	Northeast Prong
DARE 02	Sawyer Lake
DARE 03	Grassy Patch Road
DARE 04	Alligator River NWR Central
DARE 05	Borrow Pit Road
DARE 06	Alligator Road
DARE 07	Lost Lake North
Dare County Range	
DARE 08	Taylor Road Natural Area
DARE 09	Richmond Road
DARE 10	Sycamore Road
DARE 11	Beechland Central
DARE 12	Beechland South
DARE 13	Air Force Lead
DARE 14	Dry Ridge at Hooper
DARE 15	Hooper and Gator 4
DARE 16	Whipping Creek Lake
DARE 17	Dry Ridge at Maple
DARE 18	Maple Road
DARE 19	DCR Central

DARE COUNTY

Northeast Prong- DARE 01

Site Size: 1500 ac

AWC Size: 84 ac; 6 stands from 7-23 acres each

NHP EO Code: 00625*009

Location: Northern Alligator River NWR; along the east side of South Lake, north and east of Northeast Prong. Not accessible by foot.

Description: Five stands of pure AWC totaling 73 acres and one mixed stand totaling 11 acres. Codominants loblolly pine, swamp black gum, red maple, and baldcypress. Stands grade to pond pine woodland.

DBH (inches): AWC: unk (mature)

Height (feet): AWC: unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 30 -> 70%

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar and Nonriverine Swamp Forest

Inspection Type: Aerial and NHP files

Sawyer Lake - DARE 02

Site Size: 2000 ac

AWC Size: 1400 ac; 5 subsites from 25-320 acres each

NHP EO Code: part of 00645*008

Location: Northcentral Alligator River NWR in Sawyer Lake vicinity (former Sawyer Lake Unit)
Access from SR 1103 or Refuge Roads.

Description: Five subsites with scattered stands. Pure AWC totals 80 acres; mixed stands total 30 acres and widely scattered AWC totals 300 acres. AWC dominant in pure stands with codominant loblolly pine. Understory of swamp black gum, fetterbush, red bay, possumhaw, inkberry, and blasphem vine. Herbs include cinnamon fern and peatmoss. Some AWC regeneration. The following description was taken from representative stands (Stand Cluster 8).

DBH (inches): AWC: 9

Height (feet): AWC: 65

Age: AWC: 65

Basal Area (square feet): AWC: 200; Stand: 230

Overall AWC coverage: <10-90%

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar and Nonriverine Swamp Forest

Inspection Type: Ground and Aerial

Grassy Patch Road- DARE 03

Site Size: - 2000 ac

AWC Size: 1021 ac; 7 subsites from 17 - 415 acres each

NHP EO Code: none

Location: Western Alligator River NWR in Grassy Patch and Gator Road vicinity (former Cypress Unit). Access from Refuge Roads.

Description: Seven subsites with scattered stands of mature forest. Pure AWC totals 436 acres, mixed stands total 35 acres, and widely scattered AWC totals 550 acres. Pure stands dominated by AWC with codominant loblolly pine. Understory of red maple, swamp bay, red bay, fetterbush, and highbush blueberry. Herbs include various ferns, white-flowered arum, partridgeberry, and peatmoss. The following stand cluster description was taken from representative stands (Stand Cluster 19).

DBH (inches): AWC: 12-18

Height (feet): AWC: 70-82

Age: AWC: 85-95

Basal Area (square feet): AWC: 295; Stand: 360

Overall AWC coverage: <10-90%

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo, Belhaven, and Roper mucks and Hyde loam

Natural Community Type: Peatland Atlantic White Cedar and Nonriverine Swamp Forest

Inspection Type: Ground and Aerial

Alligator River NWR Central - DARE 04

Site Size: 4000 ac

AWC Size: 1972 ac; 9 subsites from 40 - 550 acres each

NHP EO Code: 00645*008

Location: Scattered stands in Milltail Creek area (former Milltail, Koehring and Jackson Units); south of US 64 and east of Alligator River. Access from SR 1103 or Refuge roads.

Description: Nine subsites with scattered stands of mature forest. Pure AWC totals 872 acres; widely scattered AWC totals 1100 acres. The following stand cluster descriptions were taken from representative stands.

DARE 04A (Stand Cluster 30)

AWC Size: 88 ac

Description: Mature AWC mixed with pond pine and swamp black gum. Understory of swamp bay, fetterbush, inkberry, red maple, and blaspheme vine. Herbs include cinnamon fern and peatmoss.

DBH (inches): AWC : 20

Height (feet): AWC : 65-70

Age: AWC: 89-99

Basal Area (square feet): AWC: 85; Stand: 190; AWC coverage: 45 %

Ownership: Public (USFWS - Alligator River NWR)

Soil: Belhaven muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground and Aerial

DARE 04B (Stand Cluster 27)

AWC Size: 325 ac

Description: Mature forest dominated by AWC with codominant loblolly pine and swamp black gum. Understory of red bay, fetterbush, inkberry, red maple, evergreen bayberry, and blaspheme vine.

Herbs include peatmoss. Some older AWC have heart rot.

DBH (inches): AWC : 7-18

Height (feet): AWC : 39-70

Age: AWC: 39-100+ (heart rot)

Basal Area (square feet): AWC: 115-180; Stand: 190-270 ; AWC coverage: 60-90%

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo and Belhaven mucks

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and Aerial

DARE 04C (Stand Cluster 13)

AWC Size: 50 acres

Description: Mature forest dominated by AWC with codominant swamp black gum. Understory of red bay, swamp bay, fetterbush, inkberry, red maple, evergreen bayberry, and blaspheme vine. Herbs include peatmoss.

DBH (inches): AWC : 6-10

Height (feet): AWC : 60-63

Age: AWC: 33-35

Basal Area (square feet): AWC: 150; Stand: 225 ; AWC coverage: 67%

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and Aerial

Borrow Pit Road- DARE 05

Site Size: 30 ac

AWC Size: 6 ac; 2 stands

NHP EO Code: none

Location: Eastern Alligator River NWR approx. 1.5 miles west of US 264 near intersection of Borrow Pit and Long Curve Roads.

Description: Two stands totaling 6 acres of mature forest dominated by AWC with codominant pong pine. Understory of loblolly bay, sweet bay, fetterbush, swamp bay, inkberry, common greenbrier, and blaspheme vine. Herbs include cinnamon fern and peatmoss.

DBH (inches): AWC : 8-11

Height (feet): AWC : 39-44

Age: AWC: 47

Basal Area (square feet): AWC: 260; Stand: 260; AWC coverage: 100%

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

Alligator Road- DARE 06

Site Size: - 500 ac

AWC Size: 196 ac; 2 subsites

NHP EO Code: none

Location: Western Alligator River NWR in Alligator Road vicinity. One subsite approx. 0.5 mile north of Alligator Road; one subsite just west of terminus of Gator 2. Access from Refuge or Dare County Range roads.

Description: Mature forest dominated by AWC with codominant swamp black gum. Pure AWC totals 141 acres; mixed stands total 55 acres. Understory of loblolly bay, inkberry, swamp bay, evergreen bayberry, highbush blueberry, and blasphem vine. Some AWC regeneration.

DBH (inches): AWC : 9

Height (feet): AWC : 39

Age: AWC: 85

Basal Area (square feet): AWC: 70-150; Stand: 170; AWC coverage: 40-90%

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar and Nonriverine Swamp Forest

Inspection Type: Ground and Aerial

Lost Lake North- DARE 07

Site Size: 150 ac

AWC Size: 45 ac; 10 stands from 2 - 15 acres each

NHP EO Code: none

Location: Southwestern Dare County; 0.25 - 1 mile west of Nichols Road just south of Dare County line.

Description: Nine stands totaling 30 acres are mature forest dominated by AWC and mixed hardwood. Pure 15 acre stand along northern shore of Lost Lake.

DBH (inches): AWC : unk (mature)

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 30 - 50 %

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo muck

Natural Community Type: Nonriverine Swamp Forest and Peatland Atlantic White Cedar

Inspection Type: Aerial

Taylor Road Natural Area - DARE 08

Site Size: 750 ac (NHP data)

AWC Size: 50 ac

NHP EO Code: 00625*034

Location: On Dare County Range in central Dare County; west of the Navy Range along Taylor, Spring, and Magnolia Roads, south of Navy Shell Road.

Description: Large area of mature forest dominated by swamp black gum with codominant red maple and occasional baldcypress, loblolly pine and AWC. Understory of red maple, swamp bay, swamp black gum, sweet pepperbush, inkberry, and highbush blueberry. Herbs include Virginia chain-fern, netted chain-fern, royal fern and partridgeberry.

DBH (inches): AWC : 12-20

Height (feet): AWC : 65-70

Age: AWC: 50-70

Basal Area (square feet): AWC: unk; Stand: unk; Overall AWC coverage: < 10%

Ownership: Public (DOD - Dare County Range)

Soil: Hyde loam, Roper muck and Belhaven muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: NHP files; site not visited for this report.

Richmond Road - DARE 09

Site Size: 39 ac

AWC Size: 39 ac

NHP EO Code: 00625*005 (Alligator River Swamp Forest)

Location: On Dare County Range in central Dare County; in a block bounded by Richmond Road, Navy Lead Road, Dry Ridge Road and the Alligator River NWR boundary. Approx. 2400 feet east of the boundary follow an old logging road south from Navy Lead until it dead ends, then proceed on same bearing for about 1000 feet to eastern edge of stand; or proceed north for 1500 feet beyond the Gibbs and Richmond junction. Access is difficult.

Description: Young mature stand dominated by AWC with codominant sweet bay, red maple, and swamp black gum. Understory of swamp bay, red bay, fetterbush, Virginia creeper, poison ivy, and blaspheme vine is nearly impenetrable. Surrounded by cutover swamp. Stand contains evidence of logging and fire. Peatmoss plentiful where ground is visible.

DBH (inches): AWC : 6-10

Height (feet): AWC : 45-55

Age: AWC: to 35

Basal Area (square feet): AWC: 90; Stand: 110; AWC coverage: 82%

Ownership: Public (DOD - Dare County Range)

Soil: Belhaven muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and NHP files.

Sycamore Road - DARE 10

Site Size: 250 ac

AWC Size: 84 ac; 2 stands

NHP EO Code: 00645*007 (Alligator River Swamp Forest)

Location: On Dare County Range; one 40 acre stand east of Dry Ridge Road and 1100 feet south of Sycamore Road; one 44 acre stand along east and west sides of Sycamore Road approximately 3300 feet south of Navy Lead.

Description: Forty acre stand (the southern stand) is a pure young mature forest dominated by AWC with occasional diameters to 18 inches. Codominant and suppressed red maple, swamp black gum, loblolly pine, and baldcypress; occasional emergent baldcypress. Dense understory of fetterbush, red and swamp bay, inkberry, and blaspheme vine. Many AWCs have peeling bark, some are dead, some are hollow or pithy. Forty-four acre stand (the northern stand) is an excellent and easily accessed example of a pure mature AWC forest with scattered mature red maple, pond pine, swamp black gum, and baldcypress. Abundant peatmoss. Small area of pithy AWCs with peeling bark was noted.

DBH (inches): AWC : Southern stand: 6-14; some to 18; Northern stand: 6-20

Height (feet): AWC : Southern stand; 47-68; Northern stand: 40-82

Age: AWC: Southern stand: 43-52; Northern stand: 42-55

Basal Area (square feet): Southern stand: AWC: 170; Stand: 230; AWC coverage: 74%

Northern stand; AWC: 200; Stand: 280; AWC coverage: 71%

Ownership: Public (DOD - Dare County Range)

Soil: Roper muck and Hyde loam

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and NHP files.

Beechland Central - DARE 11

Site Size: 750 ac

AWC Size: 725 ac

NHP EO Code: 00645*007 (Alligator River Swamp Forest)

Location: On Dare County Range; very large stand east of Beechland Road extending south to Ash Road, north to Holly Road, and west approx. two-thirds the distance to Dry Ridge Road.

Description: This is the largest stand on the DCR and an excellent example of the community type. AWC size and density varies over site; the northernmost 50 acres contain smaller AWC mixed with hardwoods. The site contains several 1-10 acre inclusions of hardwoods and hardwood-AWC. Much of the site has a basal area over 200 with small areas to 310 square feet per acre. Large baldcypress with diameters to 30 inches are common; emergent pond pines are scattered. Many AWC exhibit bear damage; on some plots, all of the trees were dead or dying. Fire scars are visible over much of the site. Mid- and understory contain red maple, swamp black gum, sweet bay, red and swamp bay, fetterbush, sweet pepperbush, and blaspheme vine. Herbs include various ferns and peatmoss. Little regeneration.

DBH (inches): AWC : 10-12; some 30-33

Height (feet): AWC : 55-65

Age: AWC: 40-45

Basal Area (square feet): AWC: 160; Stand: 200; AWC coverage: 80%

Ownership: Public (DOD - Dare County Range)

Soil: Pungo, Ponzer and Roper mucks

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and NHP files.

Beechland South - DARE 12

Site Size: 132 ac
AWC Size: 132 ac; 6 stands
NHP EO Code: 00645*007 (Alligator River Swamp Forest)
Location: On Dare County Range; immediately west of Beechland Road, north and south of Ash Road (not including the mature AWC along Air Force Lead); site surrounds a clearcut.
Description: Six stands of varying size and density; some are pure, others mixed or widely scattered. Most AWC are pulpwood-sized but some stands have trees with diameters to 14 inches. AWC ages are generally 30-40 years, but groves contain trees to 100 years. Codominants are baldcypress and loblolly pine. Understory of red and swamp bay, red maple, inkberry, wax myrtle, fetterbush, sweet pepperbush, poison ivy, and blaspheme vine. Peatmoss is common. Fire scars high on the bole of AWC were noted as was scattered bear damage.
DBH (inches): AWC : 6-12
Height (feet): AWC : 35-60
Age: AWC: 35-50
Basal Area (square feet): AWC: 50; Stand: 100; AWC coverage: 50%
Ownership: Public (DOD - Dare County Range)
Soil: Roper muck
Natural Community Type: Peatland Atlantic White Cedar
Inspection Type: Ground and NHP files.

Air Force Lead - DARE 13

Site Size: 44 ac
AWC Size: 44 ac
NHP EO Code: 00645*007 (Alligator River Swamp Forest)
Location: On Dare County Range; along the northern side of Air Force lead just west of Beechland Road.
Description: This is a high quality, pure, mature stand dominated by AWC. Dense understory of red maple, sweet bay, fetterbush, inkberry, and blaspheme vine. Occasional peatmoss.
DBH (inches): AWC : 10-22
Height (feet): AWC : 65-73
Age: AWC: 65-80+
Basal Area (square feet): AWC: 90; Stand: 150; AWC coverage: 60%
Ownership: Public (DOD - Dare County Range)
Soil: Pungo muck
Natural Community Type: Peatland Atlantic White Cedar
Inspection Type: Ground and NHP files.

Dry Ridge at Hooper - DARE 14

Site Size: - 37 ac

AWC Size: 37 ac

NHP EO Code: 00645*007 (Alligator River Swamp Forest)

Location: On Dare County Range; on the eastern side of Dry Ridge Road just east of the junction with Hooper Road.

Description: Mature stand dominated by swamp black gum with codominant AWC, red maple, and baldcypress. Very dense understory of red and swamp bay, inkberry, fetterbush, dangleberry, and blaspheme vine. Herbs include cane and peatmoss. Two-tiered AWC height structure; trees are generally 45-50 or 70-75 feet. Extensive bear damage. Many plots had dead or pithy trees. Some fire scars noted. These AWC are some of the oldest on the DCR, however, some of the ring counts are questionable due to the very dark wood and tight rings.

DBH (inches): AWC : 6-16

Height (feet): AWC : 45-70

Age: AWC: 85-109; some ring counts to 143

Basal Area (square feet): AWC: 60; Stand: 160; AWC coverage: 38%

Ownership: Public (DOD - Dare County Range)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar (NHP); appears to be Nonriverine Swamp Forest.

Inspection Type: Ground and NHP files.

Hooper and Gator 4 - DARE 15

Site Size: 350 ac

AWC Size: 144 ac; 3 stands

NHP EO Code: 00645*007 (Alligator River Swamp Forest)

Location: On Dare County Range; 45 acre subsite (south) is 700 feet northeast of Hooper Road junction with DCR; westernmost of two southern stands is directly north of Hooper Road junction with Mason Road; the easternmost is 1000 feet east of the Mason Road junction and tapers northeast to the west end of Gator 4. The 99 acre subsite (north) is on the northern and southern sides of the Gator 4 western terminus.

Description: The southern stands are mixed forests dominated by AWC and swamp black gum with codominant red maple. Surrounding brush is nearly impenetrable. The northern stand is a pure young mature forest dominated by AWC with codominant red maple, swamp black gum, baldcypress, and pine. Dense understory of fetterbush, dangleberry, inkberry, red and swamp bay. Herbs include cane and peatmoss. Northern stand has evidence of past logging and fire.

DBH (inches): AWC : 6-11

Height (feet): AWC : 40-70

Age: AWC: 57-77

Basal Area (square feet): AWC: 120; Stand: 180; AWC coverage: 67%

Ownership: Public (DOD - Dare County Range)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar (NHP)

Inspection Type: Ground and NHP files.

Whipping Creek Lake - DARE 16

Site Size: 400 ac
AWC Size: 62 ac; 2 northern stands and one southern composite stand
NHP EO Code: 00645*007 (Alligator River Swamp Forest)
Location: On Dare County Range; northeast and southeast of Whipping Creek Lake.
Description: The northern stands totaling 7 acres are dominated by mature AWC with a midstory of red maple, sweet bay, swamp black gum, baldcypress and pine. Shrub layer is thick near ground level but more open above with fetterbush, inkberry, and red and swamp bay. Southern composite stands are dominated by AWC with codominant swamp black gum, baldcypress, and pong pine. The understory is dense fetterbush, red and swamp bay, and blaspheme vine. Peatmoss is abundant. Bear damage noted in northern stands; leaning trees (from wind storm?) noted in southern area.
DBH (inches): AWC : 8-20
Height (feet): AWC : 40-80
Age: AWC: 50-100
Basal Area (square feet): AWC: 100-180; Stand: 150-265; AWC coverage: 68%
Ownership: Public (DOD - Dare County Range)
Soil: Pungo muck
Natural Community Type: Peatland Atlantic White Cedar (NHP)
Inspection Type: Ground and NHP files.

Dry Ridge at Maple - DARE 17

Site Size: 9 ac
AWC Size: 9 ac
NHP EO Code: 00645*007 (Alligator River Swamp Forest)
Location: On Dare County Range; on the western side of the junction of Maple and Dry Ridge Roads; on east side of a clearcut.
Description: Single stand dominated by swamp black gum and red maple with occasional AWC. Very dense understory of red bay, sweet gallberry, fetterbush, and blaspheme vine.
DBH (inches): AWC : 6-12
Height (feet): AWC : 50
Age: AWC: 30-40
Basal Area (square feet): AWC: 30; Stand: 110; AWC coverage: 27%
Ownership: Public (DOD - Dare County Range)
Soil: Pungo muck
Natural Community Type: Peatland Atlantic White-Cedar (NHP); appears to be Nonriverine Swamp Forest.
Inspection Type: Ground and NHP files.

Maple Road - DARE 18

Site Size: - 150 ac

AWC Size: 20 ac; 6 stands

NHP EO Code:

Location: On Dare County Range; just south of Maple road, 0.5 mile east of Willow Road junction.

Description: Scattered 2-4 acre stands dominated by swamp and red bay with codominant loblolly pine, AWC, swamp black gum, and baldcypress. Understory of fetterbush, swamp and red bay, inkberry, sweet gallberry, sweet pepperbush, and poison ivy. Herbs include Virginia chain-fern and peatmoss. Heart rot noted in some of oldest AWC.

DBH (inches): AWC : 12-20; some to 28

Height (feet): AWC : 60-80

Age: AWC: 80-106+ (heart rot)

Basal Area (square feet): AWC: 30; Stand: 195; AWC coverage: 15%

Ownership: Public (DOD - Dare County Range)

Soil: Pungo muck

Natural Community Type: Bay Forest

Inspection Type: Ground

DCR Central - DARE 19

Site Size: 816 ac

AWC Size: 816 ac

NHP EO Code:

Location: On Dare County Range; sprawling hardwood composite stand mostly contained by Dry Ridge, Beechland, and Air Force Lead Roads.

Description: Large amorphous composite stand dominated by red maple, swamp black gum, and sweet bay with widely scattered AWC, loblolly pine, and pond pine. Occasional large baldcypress with diameters to 25 inches. Dense understory of swamp black gum, red maple, choke cherry, wax myrtle, sweet pepperbush, fetterbush, inkberry, American holly, poison ivy, and blasphem vine.

DBH (inches): AWC : 6-12

Height (feet): AWC : 45-55

Age: AWC: 35-45

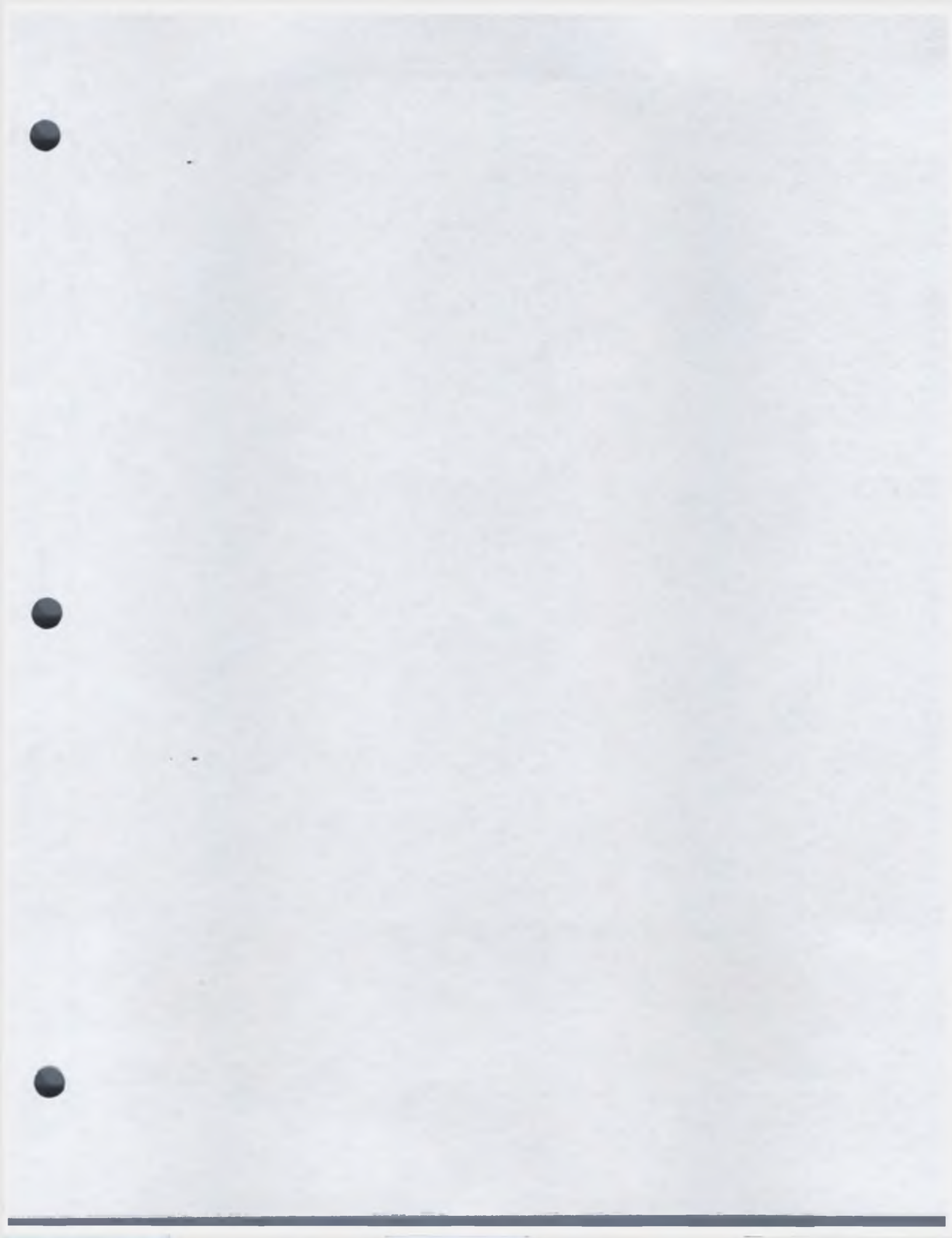
Basal Area (square feet): AWC: <5; Stand: 80; AWC coverage: <10%

Ownership: Public (DOD - Dare County Range)

Soil: Pungo, Ponzer, Belhaven, and Roper mucks

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground



Hyde County

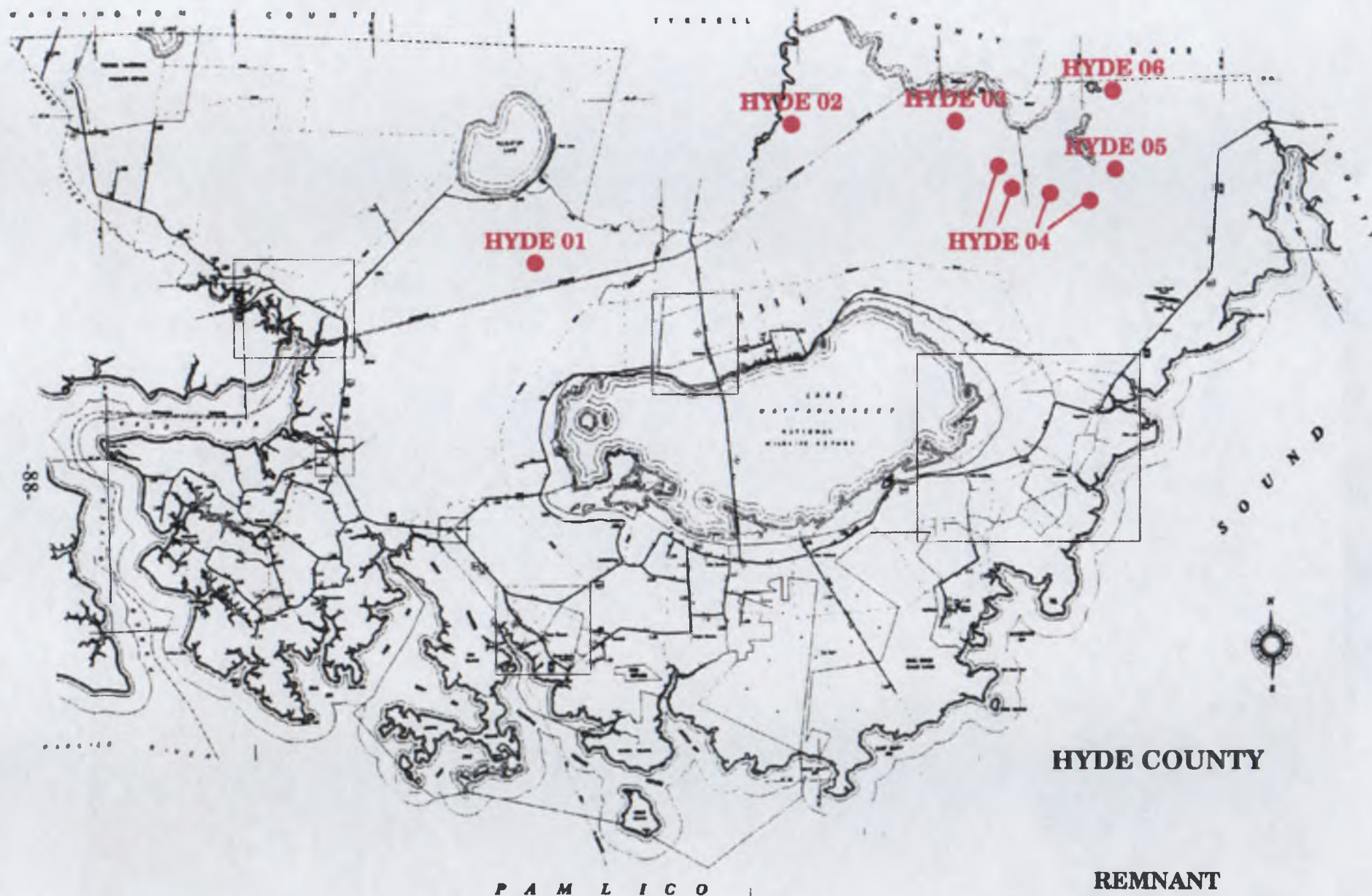
Hyde County has six known AWC stand cluster sites, four along the south side of the Alligator River between the Intracoastal Waterway (IWW) and the Dare County line, one on Roper Island between the Alligator River and the IWW, and one between New Lake and the IWW. AWC acreage totals 716 ranking Hyde County third in the state with regards to AWC abundance. Private holdings account for 40% of the total acreage; 60% is owned by the U.S. Fish and Wildlife Service and administered by Alligator River NWR (51%) and Pocosin Lakes NWR (9%). Stand sizes range from 2-100 acres; AWC coverage varies from 20->70%. Five sites were aerially inspected; for one, descriptions were taken from a NHP report.

Associates include loblolly and pond pine, baldcypress, red maple, swamp black gum, and loblolly bay. Understories include typical pocosin shrubs and herbs. No AWC regeneration was noted.

The natural community types presents are Peatland Atlantic White Cedar, Nonriverine Swamp Forest and Pond Pine Woodland with substantial transitioning along ecotones. The sole soil type is Pungo muck.

The most noteworthy site is the South Alligator River (HYDE 04) which contains four subsites with eighteen stands situated mainly on Alligator River NWR between the Alligator River on the north and private cropland on the south in the general vicinity of the Cargill Canal. Although ages and diameters could not be determined from the air, the stands appear mature and in good health.

For more information regarding AWC distribution on Alligator River NWR, see Dare County.



**REMNANT
ATLANTIC WHITE-CEDAR
SITES**

Key to Remnant Atlantic White-cedar Inventory Sites - HYDE COUNTY

<u>Label Number</u>	<u>Site Name</u>
HYDE 01	IWW
HYDE 02	Roper Island
HYDE 03	Stumpy Creek Bay
HYDE 04	South Alligator River
HYDE 05	Swan Creek Lake
HYDE 06	Lost Lake South

HYDE COUNTY

IWW - HYDE 01

Site Size: 1600 ac
AWC Size: 320 ac; scattered
NHP EO Code: none
Location: Northwestern Hyde County; 3.5 - 7 miles east of US 264 and 0.5 - 1 mile north of the Intracoastal Waterway.
Description: Mature forest dominated by pine and mixed hardwood with scattered AWC.
DBH (inches): AWC : unk (mature)
Height (feet): AWC : unk
Age: AWC: unk
Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 20%
Ownership: 70 acres Public (USFWS - Pocosin Lakes NWR) and 250 acres Private
Soil: Pungo muck
Natural Community Type: Pond Pine Woodland or Nonriverine Swamp Forest
Inspection Type: Aerial

Roper Island- HYDE 02

Site Size: 500 acres
AWC Size: 48 acres; 7 stands from 2 - 12 acres each.
NHP EO Code: 00645*015
Location: Northern Hyde County on Roper Island; bordered on the north and west by the Alligator River, on the southeast by the Intracoastal Waterway; stands in southcentral part of island.
Description: Two stands totaling 13 acres are mature, pure AWC. Five stands totaling 35 acres are mature forest dominated by AWC and pine. Many dead AWC trees near tidal stream in six acre stand.
DBH (inches): AWC : unk (mature)
Height (feet): AWC : unk
Age: AWC: unk
Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 30 - > 70%
Ownership: Private
Soil: Pungo muck
Natural Community Type: Peatland Atlantic White Cedar
Inspection Type: Aerial, NHP files

Stumpy Creek Bay - HYDE 03

Site Size: - unk
AWC Size: unk
NHP EO Code: 00625*008, 00640*009
Location: Northeastern Hyde County; 2 miles south of Stumpy Creek Bay (Alligator River).
Description: Mature forest dominated by swamp black gum, baldcypress, and AWC.
DBH (inches): AWC : unk (mature)
Height (feet): AWC : unk
Age: AWC: unk
Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: unk
Ownership: Public (USFWS - Alligator River NWR)
Soil: Pungo muck
Natural Community Type: Nonriverine Swamp Forest, Pond Pine Woodland
Inspection Type: NHP files; site not inspected for this report.

South Alligator River - HYDE 04

Site Size: 4000 ac
AWC Size: 257 ac; four subsites (A-D) with 18 stands from 2 - 100 acres each
NHP EO Code: 00640*016
Description: Mature forest dominated by AWC, pine, and hardwoods. AWC coverage varies from 10% - > 70%.
Location: 1-2 miles south of Alligator River; most stands 0.25 - 2 miles west of Cargill Canal.

HYDE 04 A

Description: Five stands from 3 - 38 acres each totaling 69 acres of AWC. One 38 acre stand is pure AWC. Other stands are mature forest dominated by AWC and hardwoods.
Location: Northeastern Hyde County; 1 mile south of the Alligator River and 2 miles west of the Cargill Canal.
DBH (inches): AWC : unk (mature)
Height (feet): AWC : unk
Age: AWC: unk
Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 50 - > 70%
Ownership: Public (USFWS - Alligator River NWR)
Soil: Pungo muck
Natural Community Type: Peatland Atlantic White Cedar
Inspection Type: Aerial

HYDE 04 B

Description: Five stands from 2 - 100 acres each totaling 143 acres of AWC. Mature forest dominated by AWC with widely scattered hardwoods.

Location: Northeastern Hyde County; 1 mile south of the Alligator River and 1 mile west of the Cargill Canal.

DBH (inches): AWC : unk (mature)

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: > 70%

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Aerial

HYDE 04 C

Description: One 2 acre stand of mature forest dominated by AWC with scattered pine.

Location: Northeastern Hyde County; 1 mile east of the Cargill Canal and 1 mile west of Fifth Avenue.

DBH (inches): AWC : unk (mature)

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: > 70%

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Aerial

HYDE 04 D

Description: Seven stands from 2-16 acres each totaling 43 acres of AWC. Mature forest dominated by pine and mixed hardwood with scattered AWC.

Location: North and south of Alligator River NWR boundary along Fifth Avenue

DBH (inches): AWC : unk (mature)

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 30%

Ownership: 11 acres Public (USFWS - Alligator River NWR) and 32 acres Private

Soil: Pungo muck

Natural Community Type: Pond Pine Woodland

Inspection Type: Aerial

Swan Creek Lake - HYDE 05

Site Size: - 125 ac

AWC Size: 55 ac; 2 stands

NHP EO Code: 00625*007

Location: Northeastern Hyde County just southeast of Swan Creek Lake southern shore.

Description: Mature forest dominated by pine and mixed hardwood with scattered AWC. Abundant loblolly bay.

DBH (inches): AWC : unk (mature)

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 30%

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Aerial

Lost Lake South- HYDE 06

Site Size: 150 ac

AWC Size: 36 ac; four stands from 2 - 30 acres each

NHP EO Code: none

Location: Northeastern Hyde County; 0.25 - 1 mile west of Nichols Road just south of Dare County line.

Description: Three stands totaling 6 acres are mature forest dominated by AWC and mixed hardwood. Pure 30 acre stand along eastern shore of Lost Lake.

DBH (inches): AWC : unk (mature)

Height (feet): AWC : unk

Age: AWC: unk

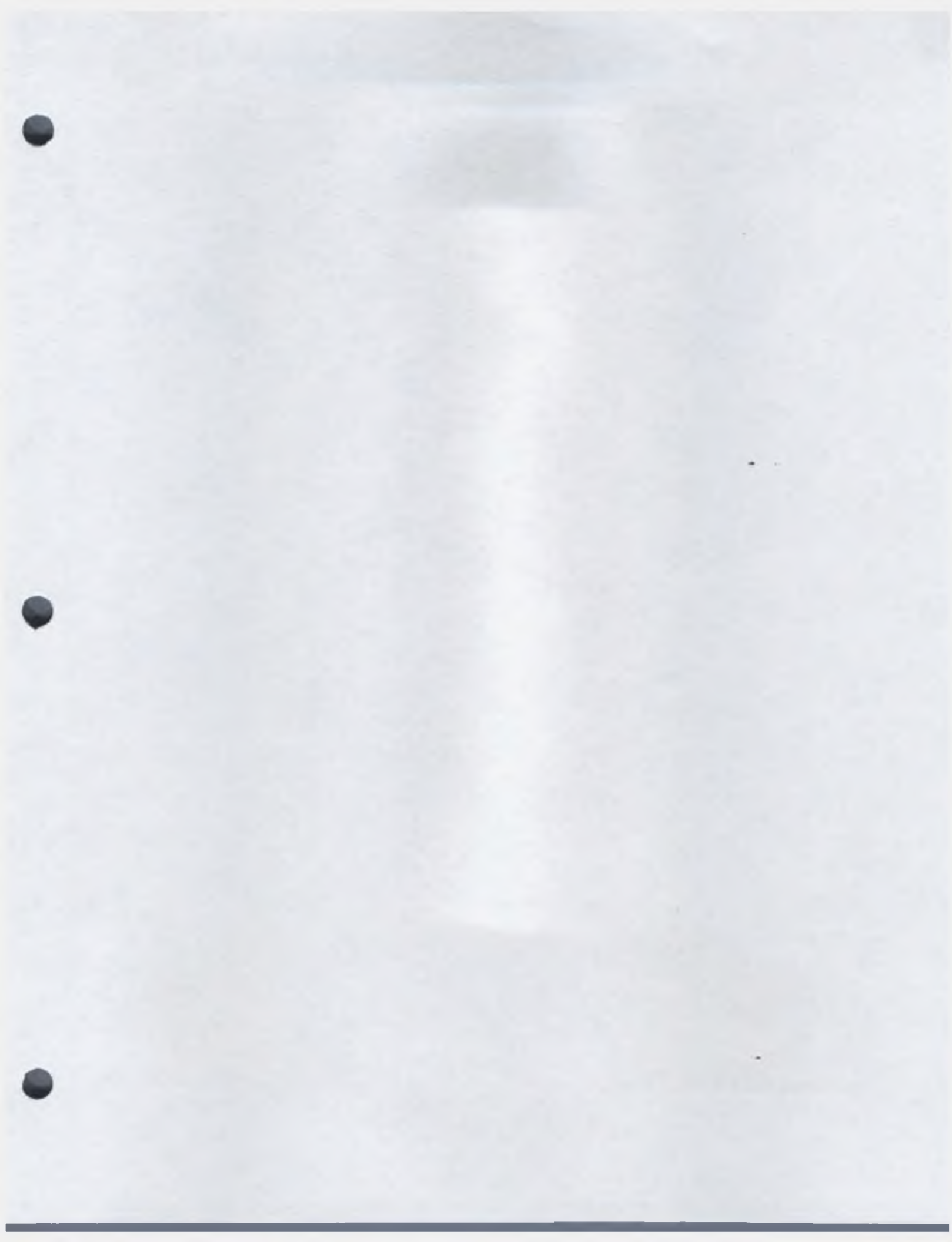
Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 30-50 %

Ownership: Public (USFWS - Alligator River NWR)

Soil: Pungo muck

Natural Community Type: Nonriverine Swamp Forest and Peatland Atlantic White Cedar

Inspection Type: Aerial



Beaufort County

Beaufort-County has two known AWC sites, one near Campbell Creek and one in Van Swamp that straddles the Washington County line. AWC acreage totals 8. Groves and widely scattered tree acreages average 2 - 3; AWC coverage varies from <10 - 50%.

Associates include loblolly pine, red maple, and sweetgum. Typical understories include fetterbush, sweet pepperbush, inkberry, American holly, highbush blueberry and greenbrier. No AWC natural regeneration was noted.

The natural community type present is Nonriverine Swamp Forest. The dominant soil types are Dare, Belhaven, and Pungo mucks.

One of the sites, Campbell Creek (BEAU 01), is noteworthy. It is a small but good quality stand of mature AWC and loblolly pine with codominant hardwoods in the southeastern portion of Beaufort County. The AWC diameters range to 18 inches and heights to 100 feet. Some bear damage and heart rot was noted.

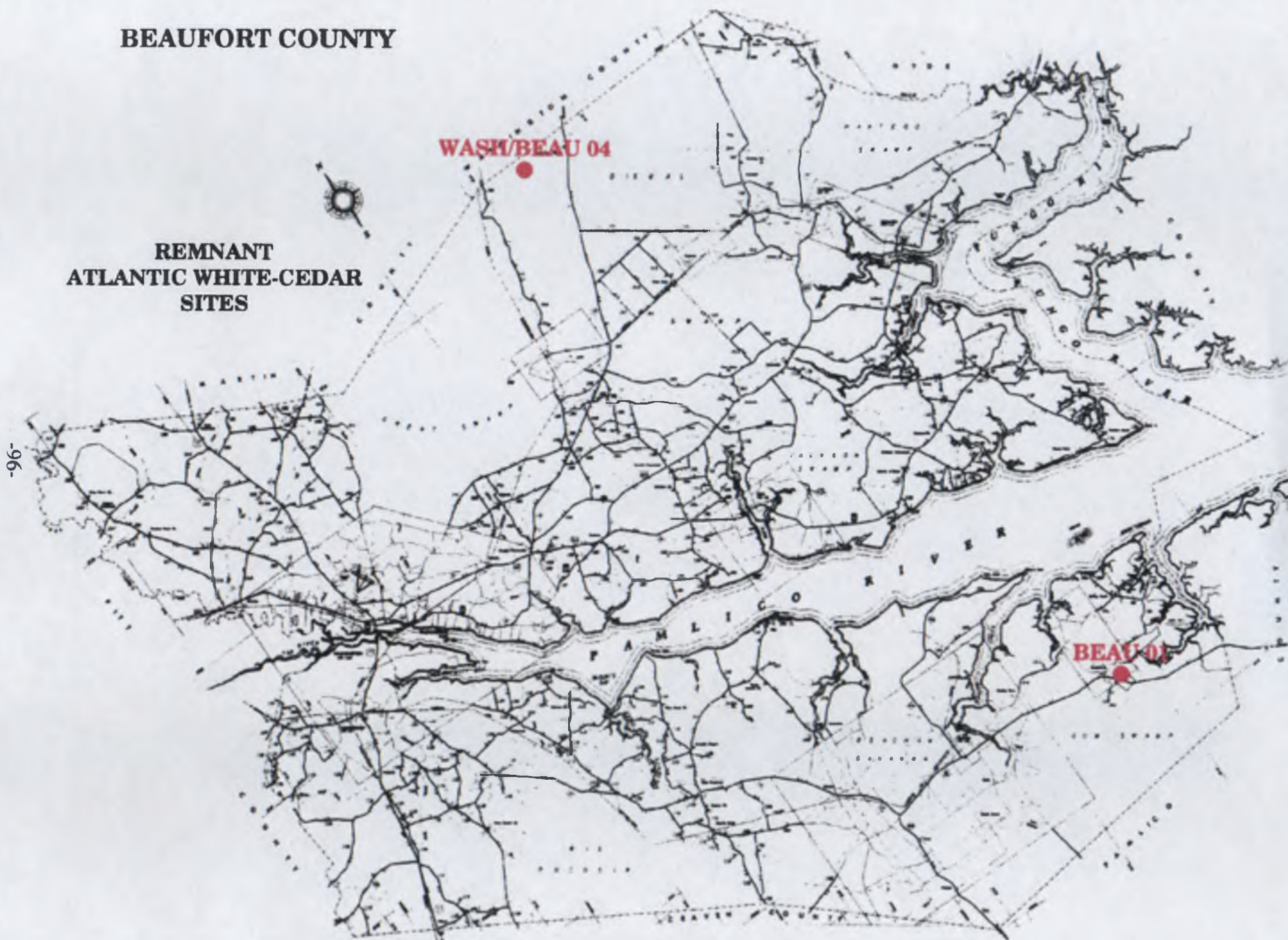
BEAUFORT COUNTY

REMNANT
ATLANTIC WHITE-CEDAR
SITES

WASH/BEAU 04

BEAU 01

-96-



Key to Remnant Atlantic White-cedar Inventory Sites - BEAUFORT COUNTY

Label Number

Site Name

BEAU 01
WASH/BEAU 04

Campbell Creek
Van Swamp

BEAUFORT COUNTY

Campbell Creek - BEAU 01

Site Size: 50 ac

AWC Size: 5-10 ac; 2 stands

NHP EO Code: none

Location: Southeastern Beaufort County at headwaters of Campbell Creek; approx 0.5 miles northeast of NC 33 and 0.5 mile east of Campbell Creek crossroads. Access by timber company roads.

Description: Two stands dominated by mature AWC and loblolly pine with codominants sweetgum, red maple. Understory of fetterbush, sweet pepperbush, inkberry, American holly, highbush blueberry, and common greenbrier. Some bear damage and heart rot in AWC.

DBH (inches): AWC : 5-18

Height (feet): AWC : 30-100

Age: AWC: unk

Basal Area (square feet): AWC: 30-60; Stand: 110-120; AWC coverage: 25-50%.

Ownership: Private (Weyerhaeuser)

Soil: Dare muck

Natural Community Type: Nonriverine Swamp Forest and Peatland Atlantic White Cedar

Inspection Type: Ground

Van Swamp - WASH/BEAU 04

Site Size: 100 ac

AWC Size: 2 ac; scattered trees in recent cutover

NHP EO Code: 00625*022

Location: Northwestern Beaufort County; approx. 1.5 miles west of NC 32 adjacent at Washington County line. Follow SR 1101 (Hollis Road) west to first logging road. Drive south, fork to southwest and continue south to county line. Remnants just south of county line along road.

Description: Approx. 185 acres of Van Swamp in Washington and Beaufort Counties that were recently logged appear to have had AWC in the canopy along with loblolly pine and red maple prior to the cutting. No intact stands were located. Remnant AWC present along logging roads and widely scattered within cutover (< 10% coverage). Cutovers regenerating in swamp bay, red bay, red maple, loblolly pine, and scattered loblolly bay.

DBH (inches): AWC: 7-12

Height (feet): AWC: 35-50

Age: AWC: 27-48

Basal Area (square feet): N/A; AWC Coverage < 10%

Ownership: Private

Soil: Pungo and Belhaven mucks

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground and NHP files

Pamlico County

Pamlico County has one known AWC site, a cluster of groves in the southern portion of the Gum Swamp. Site acreage totals less than 5 acres with AWC coverage approximately 20%. The groves are dominated by AWC, swamp black gum, and red maple with an understory of pocosin shrubs. Regenerating AWC is present along access road rights-of-way.

The natural community type present is Nonriverine Swamp Forest. The soil type is Belhaven muck.

-100-



PAMLICO COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - PAMLICO COUNTY

Label Number

Site Name

PAML 01

Abbott Tract

PAMLICO COUNTY

Abbott Tract- PAML 01

Site Size: 100 ac

AWC Size: <5 ac

NHP EO Code: none

Location: Northcentral Pamlico County in southern portion of Gum Swamp (Bay City Pocosin); approx 1 mile south of Beaufort County line and 3 miles northwest of Hollyville. Scattered groves at ends of timber company spur roads.

Description: Scattered groves dominated by mature AWC, swamp black gum, red maple. Understory of red bay, fetterbush, inkberry, and highbush blueberry. Considered gene conservation groves by landowner. Additional sapling AWC along timber road rights-of-way.

DBH (inches): AWC : 8-23

Height (feet): AWC : 75

Age: AWC: 75

Basal Area (square feet): AWC: 20; Stand: 110; AWC coverage: 20%.

Ownership: Private (Weyerhaeuser)

Soil: Belhaven muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Onslow County

Onslow County has three known AWC sites, all of which occur on Camp LeJeune Marine Corps Base for a total AWC acreage of 18. Two sites occur near the New River and one in the Great Sandy Run Pocosin. Stand sizes range from <1 - 17 acres; AWC coverage varies from <10-90%. An additional site not included in this report contains approximately 40 acres of regenerating pine, bay, and AWC.

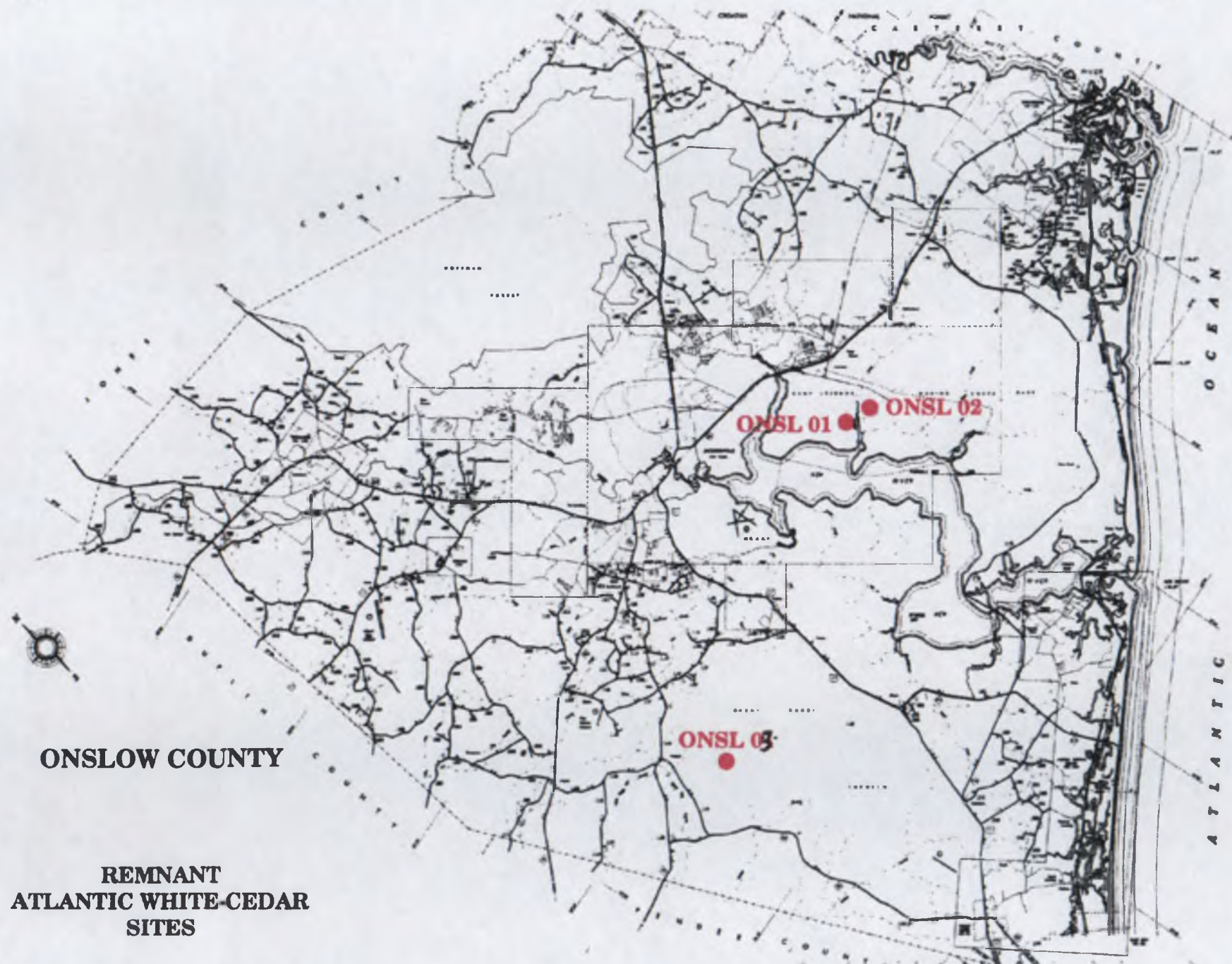
Associates include loblolly pine, red maple, swamp black gum, and sweet bay. Typical understories include red bay, fetterbush, sweet pepperbush, evergreen bayberry, highbush blueberry, titi, netted chain-fern, and peatmoss. AWC regeneration was noted for one site (ONSL 03).

All sites are classified as Nonriverine Swamp Forest. Soils include Muckalee loam, Marvyn loamy sand, and Croatan muck.

The most noteworthy site is Rawls Road (ONSL 03) in the northwestern edge of the Great Sandy Run Pocosin. This site is a 17 acre mature stand dominated by AWC, loblolly pine and swamp black gum with scattered groves of regenerating AWC. AWC ages range from 100-155 years, diameters from 15-26 inches, and heights from 52-80 feet.

ONslow COUNTY

**REMNANT
ATLANTIC WHITE CEDAR
SITES**



Key to Remnant Atlantic White-cedar Inventory Sites - ONSLOW COUNTY

Label Number

Site Name

ONSL 01

Wallace Creek

ONSL 02

Bearhead Creek

ONSL 03

Rawls Road

ONslow COUNTY

Wallace Creek - ONSL 01

Site Size: 1 ac

AWC Size: < 1 ac

NHP EO Code: none

Location: Central Onslow County approx 4 miles southeast of Jacksonville; approx. 1 mile east of confluence of Wallace Creek and New River; just north of Wallace Creek.

Description: Scattered groves dominated by red maple and swamp black gum with suppressed AWC, red bay, and sweet bay. Understory of red bay, fetterbush, American holly, sweet gallberry, sweet pepperbush, titi, and common greenbrier. Herbs include netted chain-fern and peatmoss. Storm damaged trees, some older AWC with heart rot.

DBH (inches): AWC : 10-20

Height (feet): AWC : 63-70

Age: AWC: 80+ (heart rot).

Basal Area (square feet): n/a; overall AWC coverage: < 10%.

Ownership: Public (DOD - USMC Camp LeJeune)

Soil: Marvyn loamy sand

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Bearhead Creek - ONSL 02

Site Size: 1 ac

AWC Size: < 1 ac

NHP EO Code: none

Location: Central Onslow County approx 4 miles southeast of Jacksonville; approx. 1.5 miles east of confluence of Wallace Creek and New River, 0.25 mile southeast of confluence of Wallace Creek and Bearhead Creek; on north side of Bearhead Creek.

Description: Mature grove dominated by AWC with codominant red maple, swamp black gum, and loblolly pine. Understory of sweet bay, red maple, fetterbush, highbush blueberry, American holly, inkberry, and muscadine. Herbs include netted chain-fern, cinnamon fern, and peatmoss.

DBH (inches): AWC : 12-18

Height (feet): AWC : 45-65

Age: AWC: 70-106

Basal Area (square feet): AWC: 135; Stand: 150; AWC coverage: 90%.

Ownership: Public (DOD - USMC Camp LeJeune)

Soil: Muckalee loam

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

Rawls Road- ONSL 03

Site Size: - 17 ac

AWC Size: 17 ac

NHP EO Code: none

Location: Westcentral Onslow County; on northwestern edge of Great Sandy Run Pocosin approx 1 mile southeast of Padgett and 1 mile east of SR 1104; adjacent to east and west sides of Rawls Road (unimproved) between Bear Alley and Hewetts Highway.

Description: Mature stand dominated by AWC, loblolly pine, and swamp black gum. Understory of red bay, fetterbush, sweet pepperbush, and common greenbrier. Herbs include netted chain-fern and peatmoss. Closed canopy. Some storm damaged trees. Some groves of sapling and pulpwood-sized AWC.

DBH (inches): AWC : 15-26

Height (feet): AWC : 52-80

Age: AWC: 100-155

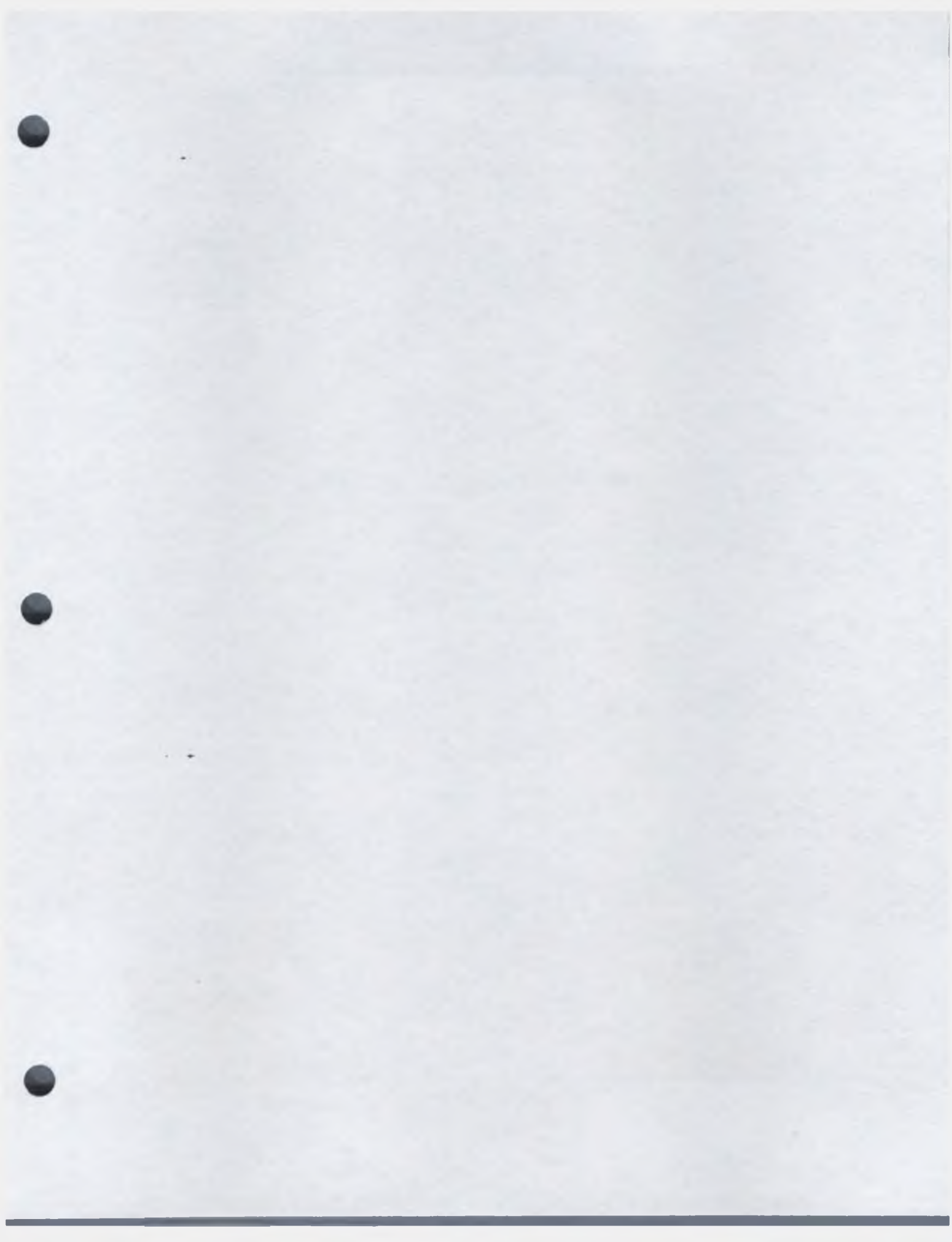
Basal Area (square feet): AWC: 30; Stand: 115; AWC coverage: 25%.

Ownership: Public (DOD - USMC Camp LeJeune)

Soil: Croatan muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground



Jones County

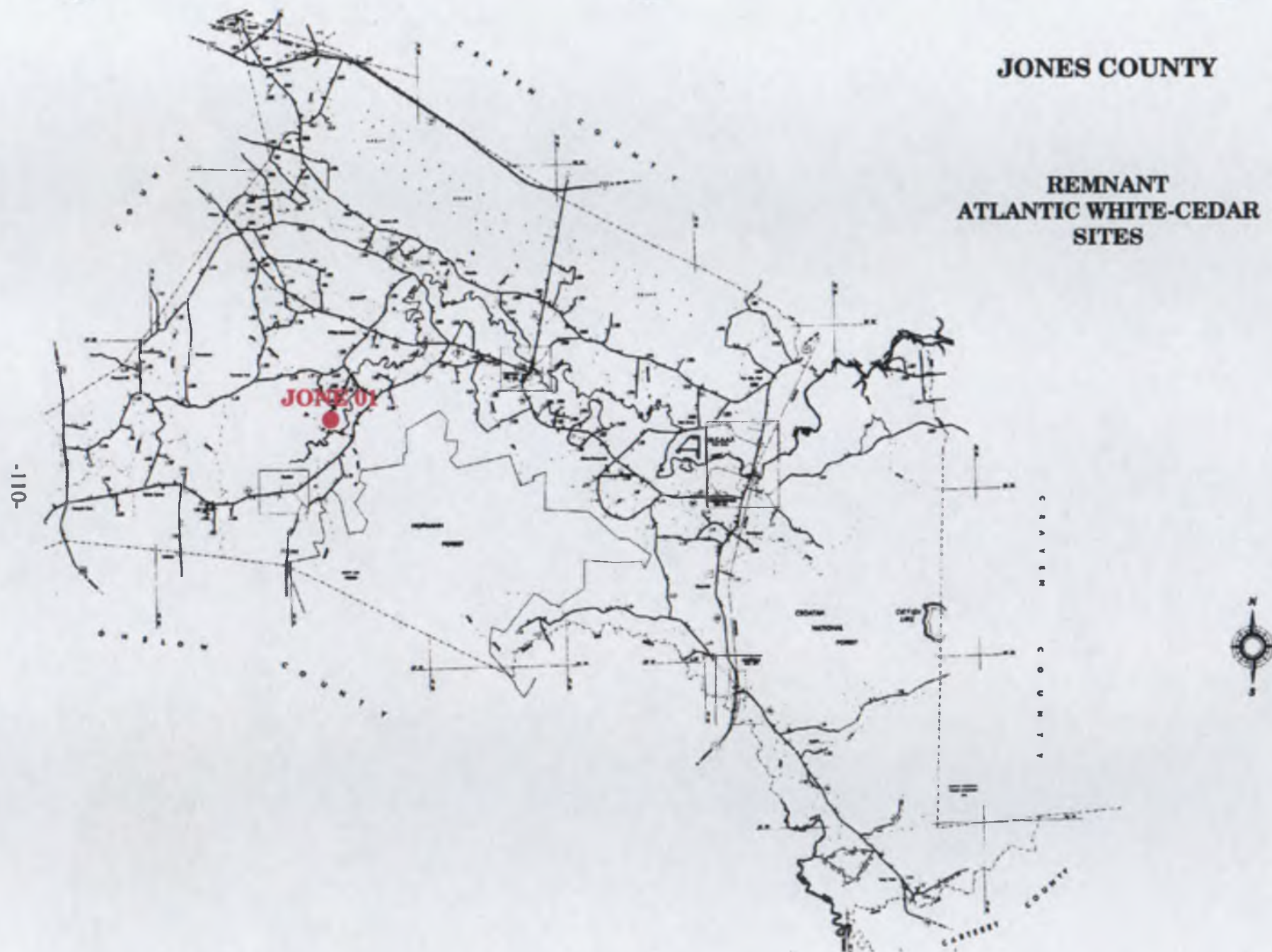
Jones County has one observed AWC site totaling 30 acres. The site, the Stone Chapel Road stand (JONE 01) is located just east of Mill Branch approximately three miles southeast of Coombs Fork and has an AWC coverage of <10%. Here, AWC occurs in mixed groves with swamp black gum, water oak, sweetgum, red maple, and loblolly pine. The understory consists of highbush blueberry, fetterbush, sweet gallberry, American holly, sweet pepperbush, blackberry, and greenbrier.

The natural community type is Coastal Plain Bottomland Hardwood and the soil type is Woodington fine sandy loam.

JONE 01 has AWC ages from 8 -40 years and a total basal area of 130 square feet per acre, less than 10 of which is attributed to AWC.

JONES COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - JONES COUNTY

Label Number

Site Name

JONE 01

Stone Chapel Road

JONES COUNTY

Stone Chapel Road - JONE 01

Site Size: 75 ac

AWC Size: 30 ac

NHP EO Code: none

Location: Western Jones County; approx 3 miles southeast of Coombs Fork; south of SR 1131 terminus on Stone Chapel Road.

Description: Scattered groves of AWC in forest that surrounds pasture and private home site. Mixed with swamp black gum, water oak, sweetgum, red maple, and loblolly pine. Understory of red bay, highbush blueberry, fetterbush, sweet gallberry, American holly, sweet pepperbush, blackberry, and common greenbrier. No recent AWC regeneration. Closed canopy.

DBH (inches): AWC : 3-8

Height (feet): AWC : 10-55

Age: AWC: 8-40

Basal Area (square feet): AWC: 10; Stand: 100; AWC coverage: 10%.

Ownership: Private

Soil: Woodington fine sandy loam

Natural Community Type: Coastal Plain Bottomland Hardwoods

Inspection Type: Ground

Craven County

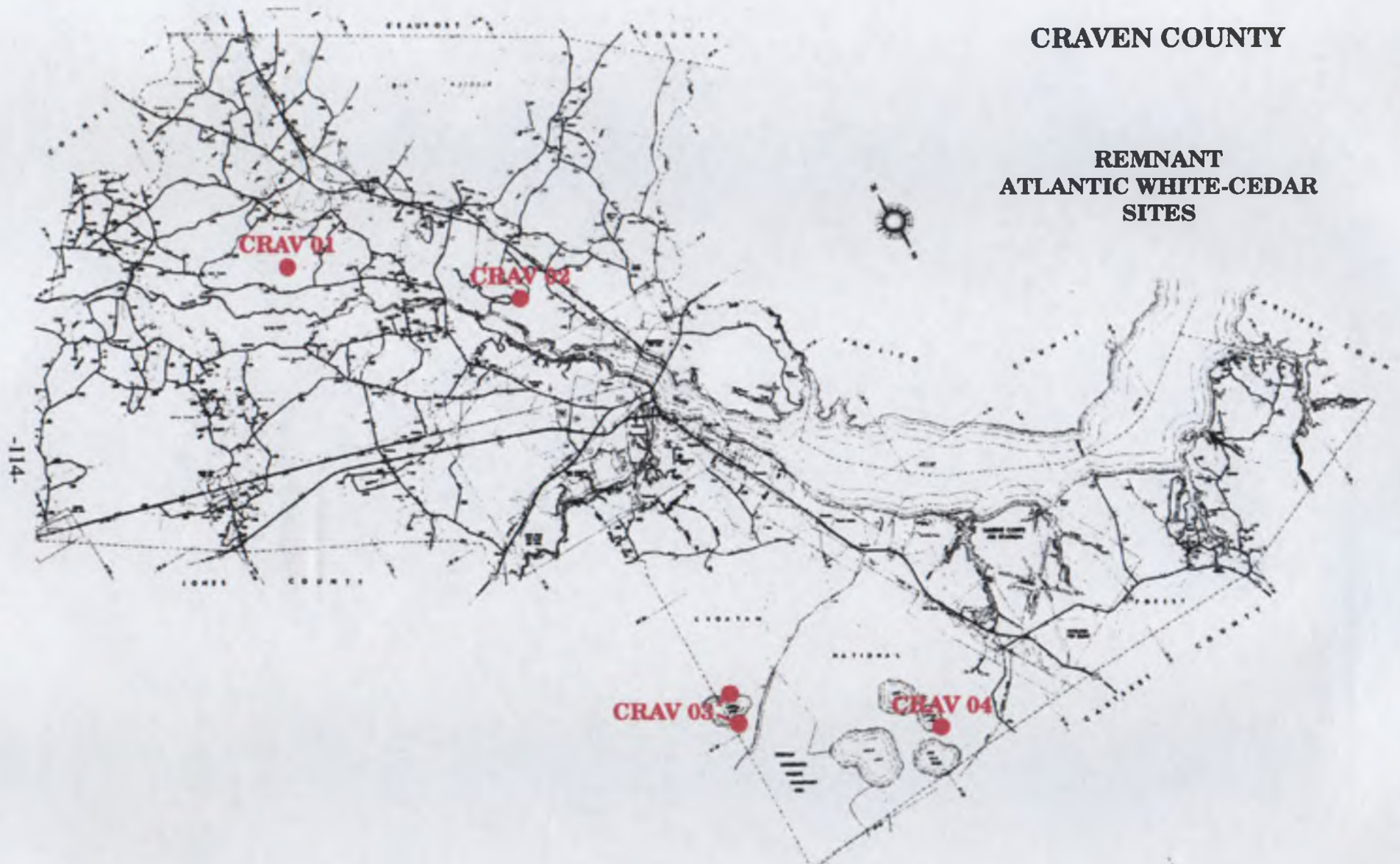
Craven County has four known AWC sites, one in the Bear Hole Pocosin, one along the fringe of the Neuse River Swamp, one at Catfish Lake, and one between Little Lake and Lake Ellis Simon. The county AWC acreage totals approximately 13. Stand size ranges from <2 - 5 acres; AWC coverage averages 10%.

Associates include loblolly and pond pine, red maple, tuliptree, and swamp black gum. Typical understories include red bay, American holly, sweet gallberry, fetterbush, swamp-honeysuckle, various ferns, and peatmoss. No substantial regeneration was observed.

The natural community types present are Bay Forest and Nonriverine Swamp Forest. The soil types are Ponzer, Croatan, Dare, and Dorovan mucks.

CRAVEN COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - CRAVEN COUNTY

Label Number

Site Name

CRAV 01

Bear Hole Pocosin

CRAV 02

Cool Springs

CRAV 03

Catfish Lake

CRAV 04

Little Lake

CRAVEN COUNTY

Bear Hole Pocosin - CRAV 01

Site Size: 30 ac

AWC Size: 5 ac

NHP EO Code: none

Location: Western Craven County in Bear Hole Pocosin; approx 1.5 miles north of SR 1400, 2 miles west of SR 1443, and 3 miles east of SR 1448; along timber company road.

Description: Widely scattered AWC mixed with red maple, swamp black gum, and sweetgum. Understory of red bay, sweet pepperbush, inkberry, and blaspheme vine. Some bear damage. Heart rot in oldest AWC. Considered gene conservation area by landowner.

DBH (inches): AWC : 14-24

Height (feet): AWC : 75-100

Age: AWC: 45-50 (heart rot)

Basal Area (square feet): AWC: 10; Stand: 110; AWC coverage: <10%.

Ownership: Private (Weyerhaeuser)

Soil: Ponzer muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Cool Springs - CRAV 02

Site Size: 10 ac

AWC Size: <2 ac

NHP EO Code: none

Location: Central Craven County; 2.5 miles southwest of Askin at southern tip of Cool Springs Road (timber company road).

Description: Widely scattered AWC at fringe of Neuse River swamp. Mixed with loblolly pine, red maple, yellow poplar, and swamp black gum. Understory of American holly, sweet gallberry, fetterbush, red bay, and swamp-honeysuckle. Herbs include royal fern, cinnamon fern, and peatmoss. Considered gene conservation area by landowner.

DBH (inches): AWC : 10-23

Height (feet): AWC : 65

Age: AWC: 65-75

Basal Area (square feet): AWC: <20; Stand: 130; AWC coverage: 10%.

Ownership: Private (Weyerhaeuser)

Soil: Dorovan muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Catfish Lake - CRAV 03

Site Size: - 50 ac

AWC Size: <5 ac

NHP EO Code: none

Location: Southern Craven County; along northeastern and southeastern shores of Catfish Lake.

Description: Widely scattered AWC around northeastern shore of Catfish Lake; scattered groves of AWC around southeastern shore. Reported to be separate from AWC plantation in same area.

DBH (inches): AWC : 4-6

Height (feet): AWC : 30

Age: AWC: 40

Basal Area (square feet): AWC: unk; Stand: unk

Ownership: Public (US Forest Service - Croatan National Forest)

Soil: Croatan and Dare mucks

Natural Community Type: Bay Forest

Inspection Type: USFS communication

Little Lake - CRAV 04

Site Size: 100 ac

AWC Size: <5 ac

NHP EO Code: 00650*006

Location: Southern Craven County; between Little Lake and Lake Ellis Simon.

Description: Widely scattered AWC around the southern edge of Little Lake and the eastern edge of Lake Ellis Simon. Mixed with pond pine and bays. Some bear damage.

DBH (inches): AWC : 4-6

Height (feet): AWC : unk

Age: - AWC: unk

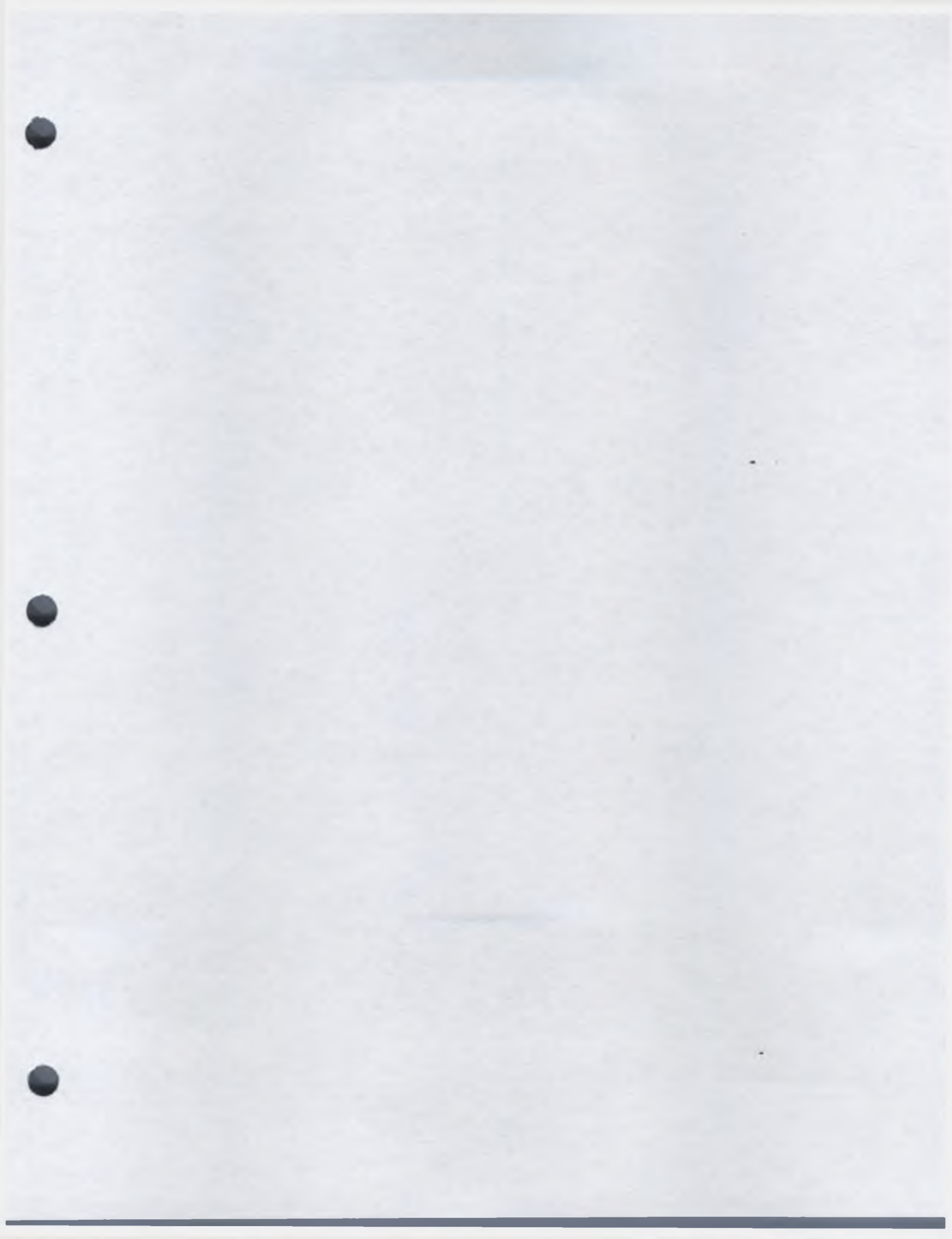
Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: <10%.

Ownership: Private

Soil: Croatan muck

Natural Community Type: Bay Forest

Inspection Type: Land manager communication



Brunswick County

Brunswick County has eight known AWC sites, five in the Green Swamp vicinity, two along the the southern stretch of the Waccamaw River, and one near Lewis Swamp. Known AWC acreage totals 243, ranking Brunswick County the seventh highest county in terms of AWC abundance. Acreage for the Reeves Area Floodplains site (BRUN 06) is unknown. Stand sizes range from <8 - 78 acres; AWC coverage varies from 15-75%. Two sites along the Waccamaw River were inaccessible from the ground and deserve aerial inspection.

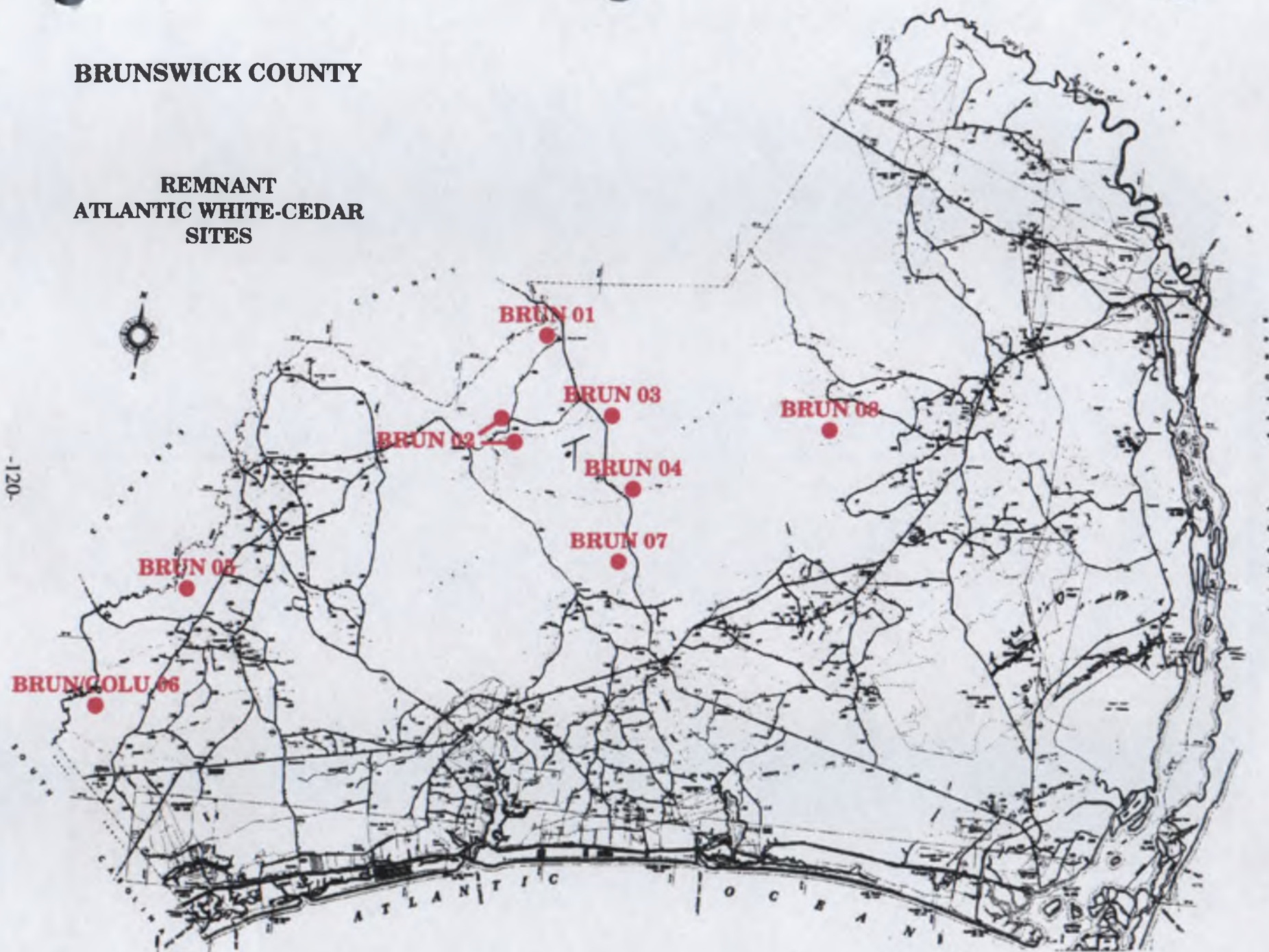
Associates include loblolly pine, water oak, laurel oak, overcup oak, red maple, swamp black gum, baldcypress, and sweet bay. Typical understories include red and swamp bay, fetterbush, sweet pepperbush, evergreen bayberry, American holly, highbush blueberry, blackberry, inkberry, greenbrier, blasphem vine, and peatmoss. AWC regeneration was noted for one site (BRUN 03).

Natural community types include Coastal Plain Bottomland Hardwoods, Nonriverine Swamp Forest, and Bay Forest. Dominant soils include Muckalee loam and Dorovan muck.

The majority of the Brunswick County sites occur in the remnants of the Green Swamp which covered approximately 200,000 acres prior to extensive logging in the first half of the twentieth century (Moore and Carter 1987). Noteworthy sites include Camp Branch Road (BRUN 03) and Green Swamp Preserve (BRUN 05). BRUN 03 is a 100 acres site with mature and young AWC around the perimeters of three recently clearcut stands; this site could provide regeneration study opportunity. BRUN 05 contains 58 acres of mature AWC along the headwaters of Driving Creek on the Green Swamp Preserve. An additional 70 acres of pulp-sized AWC was reported to occur in the general vicinity of BRUN 05 but was not included in this report.

BRUNSWICK COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - BRUNSWICK COUNTY

<u>Label Number</u>	<u>Site Name</u>
BRUN 01	Honey Island
BRUN 02	Camp Branch Road
BRUN 03	Rattlesnake Swamp
BRUN 04	Green Swamp Preserve
BRUN 05	Reeves Area Floodplains
BRUN 06	Waccamaw River Oxbow Site
BRUN 07	Big Island
BRUN 08	Lewis Swamp

BRUNSWICK COUNTY

Honey Island- BRUN 01

Site Size: 150 ac

AWC Size: 130 acres; 3 stands, 1 stand 15 acres, 1 stand 34 acres, 1 stand 78 acres

NHP EO Code: none

Location: Northeastern Brunswick County; just northwest of intersection of NC 211 and SR 1340, south of Big Swamp.

Description: Mature forest along Big Swamp dominated by swamp black gum, baldcypress, and loblolly pine with some AWC. Understory of red maple, sweet bay, sweet pepperbush, red bay, blaspheme vine, common greenbrier, and inkberry. Herbs include cinnamon fern and peatmoss.

DBH (inches): AWC: 12-13

Height (feet): AWC (mature): 60

Age: AWC (mature): 65

Basal Area (square feet): AWC: 15; Stand: 150; AWC coverage: variable to 15%.

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Camp Branch Road - BRUN 02

Site Size: 100 ac

AWC Size: < 10 acres on borders of recent clearcuts

NHP EO Code: none

Location: Northeastern Brunswick County; at intersection of SR 1340 and SR 1341, along east and west sides of SR 1340.

Description: Mature and young AWC around perimeters of three recently cut stands totaling 100 acres. Perimeter understory of sweet pepperbush, highbush blueberry, sweet gallberry, and fetterbush. AWC regeneration in openings and along skid trails.

DBH (inches): AWC (mature): 12-13

Height (feet): AWC (mature): 65

Age: AWC (mature): 68

Basal Area (square feet): AWC: n/a; Stand: n/a; AWC border coverage: 15-75%.

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Rattlesnake Swamp - BRUN 03

Site Size: - 20 ac

AWC Size: 20 ac

NHP EO Code: none

Location: Eastern Brunswick County; in Rattlesnake Swamp, east of NC 211, approx. 2.5 miles south of Honey Island.

Description: Mature forest dominated by swamp black gum with codominant baldcypress, red maple, and AWC. Understory of red bay, swamp bay, fetterbush, sweet pepperbush, evergreen bayberry, and blaspheme vine. Herbs include peatmoss

DBH (inches): AWC: 10-13

Height (feet): AWC: 45-58

Age: AWC: 45-55

Basal Area (square feet): AWC: 45; Stand: 180; AWC coverage: 25%.

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Bay Forest

Inspection Type: Ground

Green Swamp Preserve - BRUN 04

Site Size: 69 ac

AWC Size: 58 ac

NHP EO Code: 00650.001

Location: Eastern Brunswick County; along Driving Creek, east of NC 211, eight miles north of Supply.

Description: Margins of a small creek headwaters on a large peat dome. Forest dominated by loblolly bay, sweet bay, red maple, AWC, pond pine, and swamp black gum. Dense shrubs. Approx. 70 acres of pure pulpwood-sized-sized AWC in vicinity.

DBH (inches): AWC (mature): unk

Height (feet): AWC (mature): unk

Age: AWC (mature): unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: unk

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Bay Forest

Inspection Type: Ground and NHP files

Reeves Area Floodplains - BRUN 05

Site Size: 1000 ac

AWC Size: unk

NHP EO Code: 00430*002

Location: Western Brunswick County east of Waccamaw River and north of NC 904; west and east of river. Access by timber company road or by river.

Description: Mature forest dominated by loblolly pine, swamp laurel oak and AWC with some overcup oak and red maple.. Primary shrubs are mayberry and titi. Cane is dense in patches.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: unk.

Ownership: Private

Soil: Muckalee loam

Natural Community Type: Coastal Plain Bottomland Hardwoods

Inspection Type: NHP files; site not visited for this report.

Waccamaw River Oxbow Site - BRUN/COLU 06

Site Size: 500 ac

AWC Size: 25 ac; scattered stands < 8 acres

NHP EO Code: 00430*003

Location: Western Brunswick County and eastern Columbus County; on both sides of river, about 4-6 miles downstream from NC 904.

Description: Low ridges on floodplain. Forest dominated by swamp laurel oak and loblolly pine, with overcup oak, water oak, red maple, sweetgum, and AWC. Understory of bays and gallberry. Some parts mature to old, other parts selectively cut recently. Trees 24-28" DBH in older parts.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: unk.

Ownership: Private

Soil: Muckalee loam

Natural Community Type: Coastal Plain Bottomland Hardwoods

Inspection Type: NHP files; site not visited for this report.

Big Island - BRUN 07

Site Size: 25 ac

AWC Size: 5 ac; scattered groves

NHP EO Code:

Location: Central Brunswick County on western side of NC 211 from 0.25 - 0.5 mile south of Driving Creek.

Description: Forest dominated by mixed hardwoods and pine with scattered AWC groves.

DBH (inches): AWC : unk (mature)

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 10-20%.

Ownership: Private

Soil: Croatan muck

Natural Community Type: Bay Forest or Nonriverine Swamp Forest

Inspection Type: TNC Land Manager communication; site not visited for this report.

Lewis Swamp - BRUN 08

Site Size: 25 ac

AWC Size: 5 ac; scattered groves

NHP EO Code:

Location: Eastern Brunswick County in the Lewis Swamp, 0.5 -1 mile south of SR 1410 and 0.25 - 0.5 mile west of Lewis Branch.

Description: Forest dominated by mixed hardwoods and pine with scattered AWC groves.

DBH (inches): AWC : unk (mature)

Height (feet): AWC : unk

Age: AWC: unk

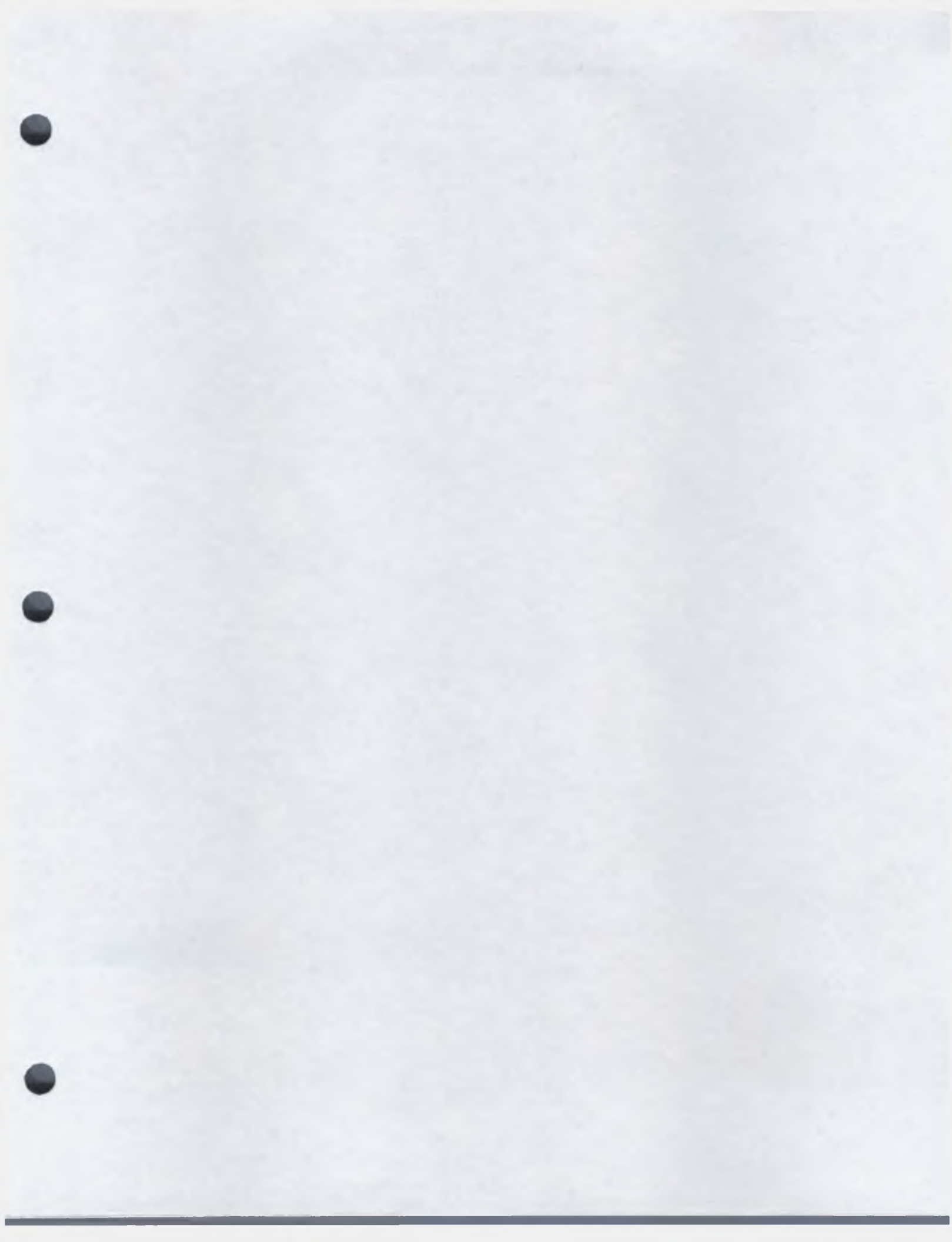
Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 10-20%.

Ownership: Private

Soil: Woodington fine sandy loam

Natural Community Type: Bay Forest or Nonriverine Swamp Forest

Inspection Type: TNC Land Manager communication; site not visited for this report.



New Hanover County

New Hanover County has one observed AWC site totaling 34 acres. The site, the Northeast Cape Fear River stand (NEWH 01) is located 1 mile south of the confluence of Long Creek and the Northeast Cape Fear River and has an AWC coverage of 90%. Additional AWC is widely scattered over an unknown acreage in the general vicinity. This area deserves further inspection, preferably from the air.

Associates include loblolly pine and red bay. The understory contains swamp bay, red bay, fetterbush, titi, greenbrier, and peatmoss.

The natural community type is Peatland Atlantic White Cedar with the perimeter transitioning to Bay Forest. The soil type is the Dorovan - Johnston association..

NEWH 01 has AWC ages from 50 -127 years and a total basal area of 265 square feet per acre, 240 of which is attributed to AWC.



NEW HANOVER COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES

Key to Remnant Atlantic White-cedar Inventory Sites - NEW HANOVER COUNTY

Label Number

Site Name

NEWH 01

Northeast Cape Fear River

NEW HANOVER COUNTY

Northeast Cape Fear River - NEWH 01

Site Size: 34 ac

AWC Size: 34 ac ; 1 stand

NHP EO Code: none

Location: Northwestern New Hanover County; approx 1 mile south of the confluence of Long Creek and Northeast Cape Fear River, just west of Horse Shoe Road (private).

Description: Mature forest dominated by AWC with codominant red bay and loblolly pine.

Understory of swamp bay, red bay, fetterbush, titi, and common greenbrier. Herbs include cinnamon fern and peatmoss. Closed canopy, open understory. Additional unknown acreage of widely scattered AWC in general vicinity.

DBH (inches): AWC : 7-17

Height (feet): AWC : 50-72

Age: AWC: 50-127

Basal Area (square feet): AWC: 240; Stand: 265; AWC coverage: 90%.

Ownership: Private

Soil: Dorovan-Johnston association

Natural Community Type: Peatland Atlantic White Cedar and Bay Forest

Inspection Type: Ground

Pender County

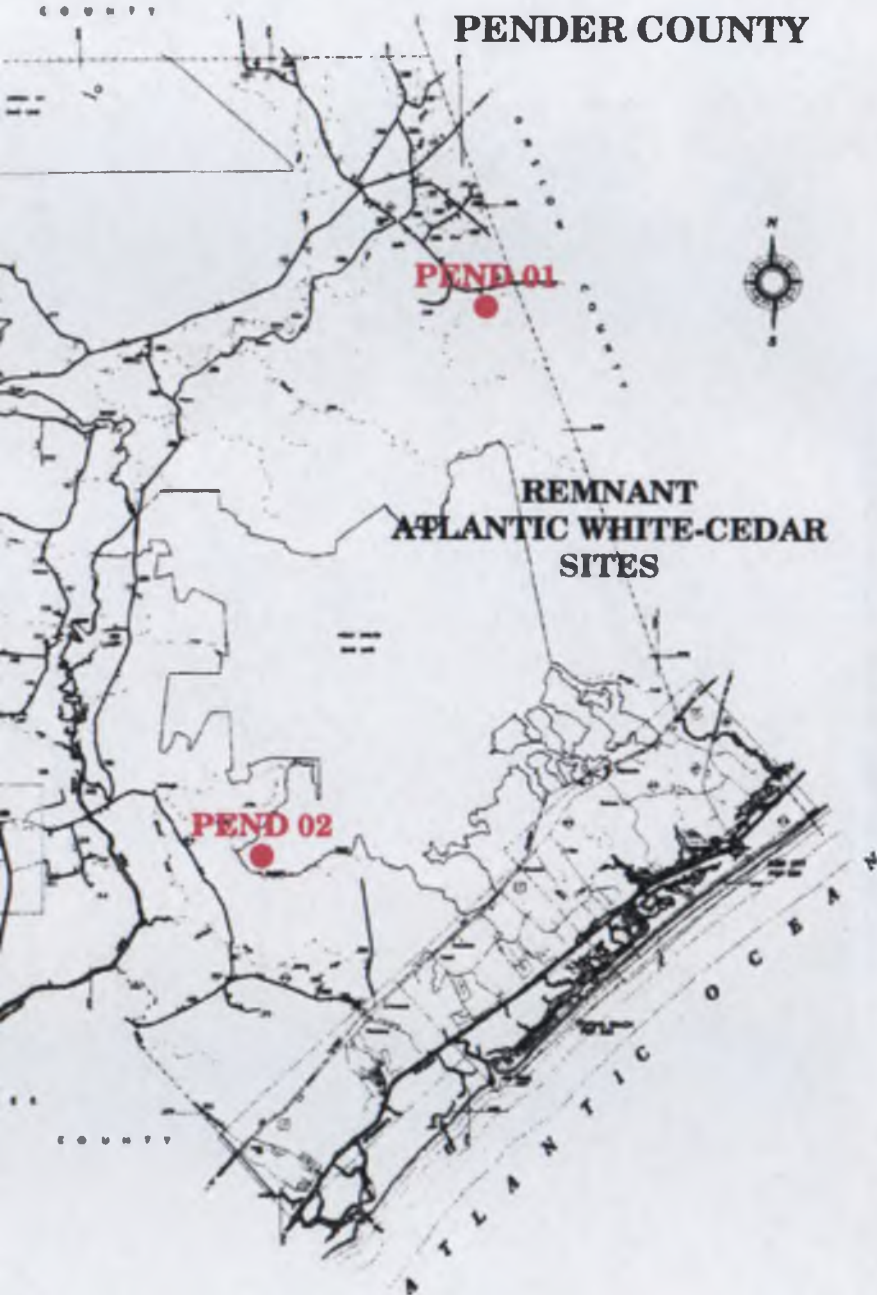
Pender County has two known AWC sites, both in the eastern portion of the county. One site, near Sandy Run Swamp, contains mature and sapling AWC groves around the perimeter of a recent clearcut; the other contains widely scattered AWC east of the Trumpeter Swamp headwaters in the Holly Shelter Game Land. AWC acreage totals approximately 1; coverage is <10-30%.

Associates in the Trumpeter Swamp area include swamp black gum and baldcypress. Understories include red bay, gallberries, fetterbush, red maple, sweetgum, sweet pepperbush, cane and Virginia chain-fern. AWC regeneration was noted around the Sandy Run Swamp site.

The natural community type present is Coastal Plain Bottomland Hardwoods. The soil type is Muckalee loam.



PENDER COUNTY



Key to Remnant Atlantic White-cedar Inventory Sites - PENDER COUNTY

Label Number

Site Name

PEND 01

Sandy Run Swamp

PEND 02

Trumpeter Swamp

PENDER COUNTY

Sandy Run Swamp - PEND 01

Site Size: 15 ac

AWC Size: < 2 ac

NHP EO Code: none

Location: Northeastern Pender County; 3.5 miles southeast of Maple Hill; 0.75 miles east of NC 50 intersection with SR 1532; stand between Sandy Run Swamp and NC 50.

Description: Recently cleared site with sapling and mature AWC groves along perimeter. Border understory of dense red maple, sweetgum, sweet pepperbush, wax myrtle, and inkberry. Herbs include cane and Virginia chain-fern.

DBH (inches): AWC : 4-16

Height (feet): AWC : 30-50

Age: AWC: 20-62

Basal Area (square feet): AWC: n/a Stand: n/a; AWC border coverage: 30%

Ownership: Private

Soil: Muckalee loam

Natural Community Type: Coastal Plain Bottomland Hardwoods

Inspection Type: Ground

Trumpeter Swamp - PEND 02

Site Size: 50 ac

AWC Size: < 1 ac

NHP EO Code: none

Location: Southeastern Pender County in Holly Shelter Game Land; on east side of Trumpeter Swamp headwaters.

Description: Widely scattered AWC along Trumpeter Swamp headwaters with swamp black gum and baldcypress. Understory of red bay, inkberry, and fetterbush.

DBH (inches): AWC : 8-10

Height (feet): AWC : 40-50

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: < 10%

Ownership: Public (NCDEHNR - Holly Shelter Game Land)

Soil: Muckalee loam

Natural Community Type: Coastal Plain Bottomland Hardwoods

Inspection Type: Game Land Wildlife Management Technician communication

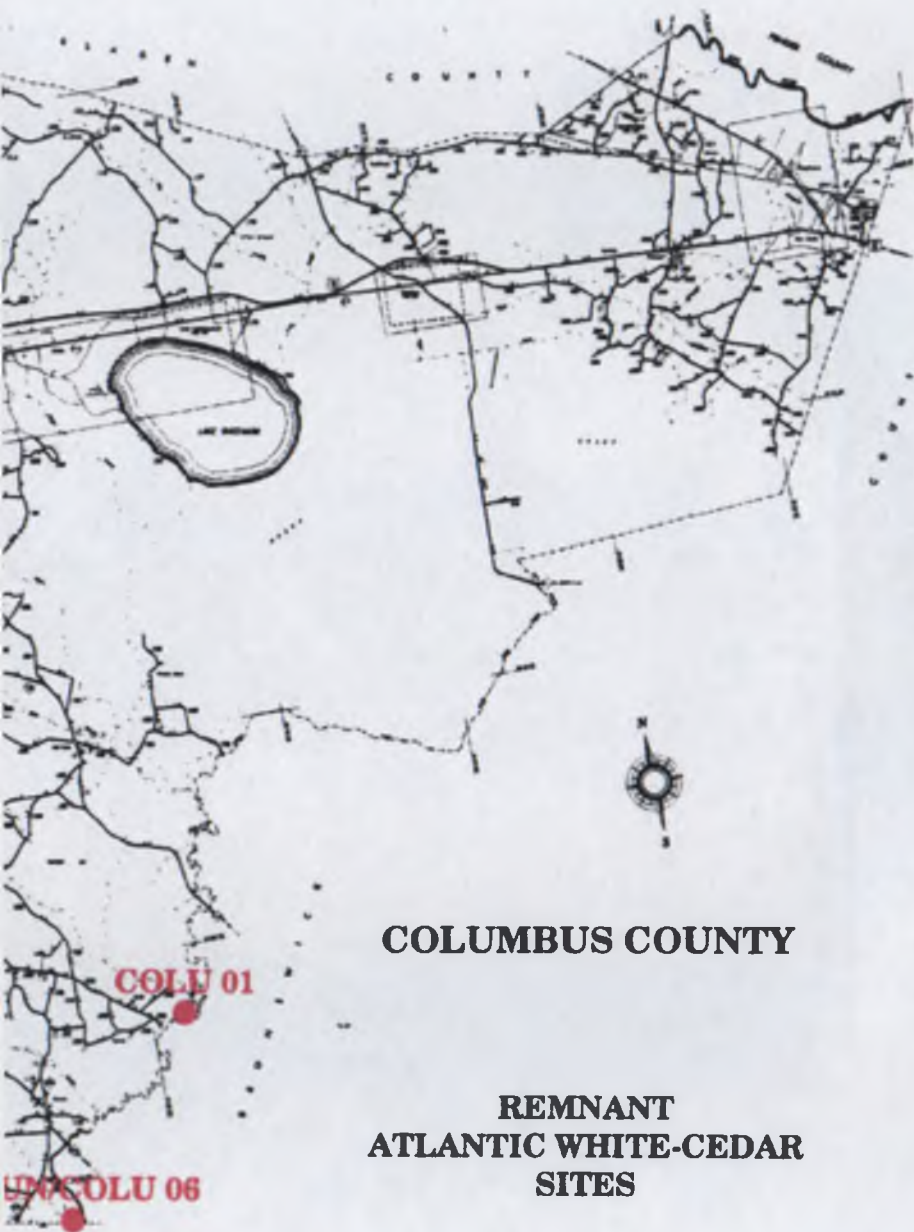
Columbus County

Columbus County has two known AWC sites, both along the southern stretch of the Waccamaw River. NHP records describe both sites as floodplain ridges and flats dominated by loblolly pine and laurel oak with scattered AWC. NHP reports that associates include water oak, red maple, sweetgum, and overcup oak, and that the understory includes red and/or swamp bay and gallberries. Neither site was accessible from the ground; this portion of Columbus County and the area known as Little Swamp just north of Juniper Creek deserve further inspection, preferably from the air.

The natural community type is Coastal Plain Bottomland Hardwoods with Muckalee loam the dominant soil.

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Key to Remnant Atlantic White-cedar Inventory Sites - COLUMBUS COUNTY

Label Number

Site Name

COLU 01
BRUN/COLU 07

Eleocharis Backwater
Waccamaw River Oxbow Site

COLUMBUS COUNTY

Eleocharis Backwater - COLU 01

Site Size: unk

AWC Size: unk

NHP EO Code: 00430*004

Location: Eastern Columbus County west of Waccamaw River; between Gore Lake and Reeves Landing.

Description: Ridges and flats in active floodplain and slightly higher terrace. Dominated by loblolly pine, and swamp laurel oak with scattered AWC, overcup oak and red maple..

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: unk.

Ownership: Private

Soil: Muckalee loam

Natural Community Type: Coastal Plain Bottomland Hardwoods

Inspection Type: NHP files; site not visited for this

Waccamaw River Oxbow Site - BRUN/COLU 06

Site Size: 500 ac

AWC Size: 25 ac; scattered stands < 8 acres

NHP EO Code: 00430*003

Location: Western Brunswick County and eastern Columbus County; on both sides of river, about 4-6 miles downstream from NC 904.

Description: Low ridges on floodplain. Forest dominated by swamp laurel oak and loblolly pine, with overcup oak, water oak, red maple, sweetgum, and AWC. Understory of bays and gallberry. Some parts mature to old, other parts selectively cut recently. Trees 24-28" DBH in older parts.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: unk.

Ownership: Private

Soil: Muckalee loam

Natural Community Type: Coastal Plain Bottomland Hardwoods

Inspection Type: NHP files; site not visited for this report.

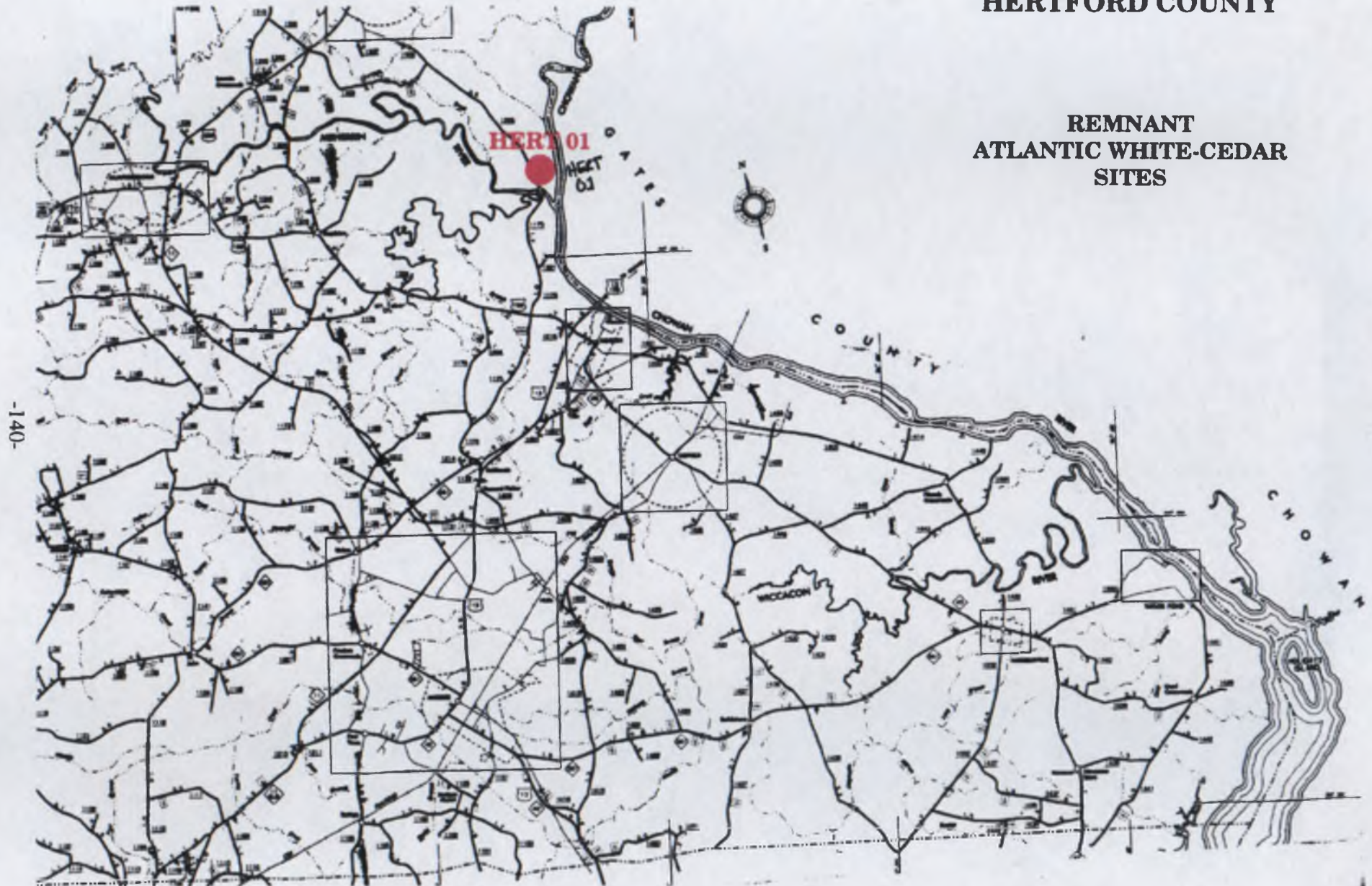
Hertford County

Hertford County has one known AWC site, the 65 acre Chowan River White Cedar Swamp (HERT 01) located in the northeastern portion of the county between the Lower Meherrin and Chowan Rivers. According to NHP records, this site is underlain by swamp peat deposits with a canopy dominated by AWC. Associates include loblolly pine, baldcypress, swamp black gum, and red maple. The understory includes a sparse shrub layer as well as various ferns. NHP also reports abundant AWC regeneration within the site.

The site is described as a Peatland Atlantic White Cedar community with a Dorovan muck soil.

HERTFORD COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - HERTFORD COUNTY

Label Number

Site Name

HERT 01

Chowan River White Cedar Swamp

HERTFORD COUNTY

Chowan River White Cedar Swamp - HERT 01

Site Size: 65 ac

AWC Size: unk

NHP EO Code: 00645*010

Location: Northeastern Hertford County; east of SR1306, 0.5 mile north of Parker's Ferry, between the Lower Meherrin River and Chowan River.

Description: (NHP): Swamp peat deposits adjacent to Chowan River. Canopy dominated by AWC with of loblolly pine, baldcypress, swamp black gum, and red maple. Dense understory of red maple.

Sparse shrub layer of sweet pepperbush and Virginia sweetspire.. Herbs mainly cinnamon fern, royal fern, and netted chain-fern. Many AWC saplings.

DBH (inches): AWC: 10-12

Height (feet): AWC: unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 50+ %

Ownership: Private

Soil: Dorovan muck

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: NHP files; site not visited for this report.

Wayne County

Wayne County has one known AWC site, Juniper Pond (WAYN 01) in the southeastern portion of the county. AWC acreage totals 90 ranking Wayne County ninth in the state with regards to AWC abundance. AWC coverage is 33-55%.

Associates in this Carolina Bay include loblolly pine, loblolly bay, and red maple. The understory contains pocosin shrubs, litsea, various ferns, and peatmoss. No regeneration was observed.

The natural community types present are Bay Forest and Peatland Atlantic White Cedar. The soil type is Torhunta loam.

AWC ages range from 52-83+ years; some of the oldest trees have heart rot.

WAYNE COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES

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WILSON COUNTY



Key to Remnant Atlantic White-cedar Inventory Sites - WAYNE COUNTY

Label Number

Site Name

WAYN 01

Juniper Pond

WAYNE COUNTY

Juniper Pond - WAYN 01

Site Size: 100 ac

AWC Size: 90 ac; 2 stands

NHP EO Code: 00645*014

Location: Southeastern Wayne County; north of SR 1745 and west of SR 1948; approx. 2 miles west of NC 111.

Description: Carolina bay with dense canopy dominated by AWC with codominant loblolly pine, loblolly bay, and red maple. Understory of highbush blueberry, sweet gallberry, inkberry, fetterbush, swamp doghobble, dangleberry, sweet pepperbush, and, in an opening, pondspice.. Herbs include cinnamon fern, Virginia chain-fern, and peat moss. Oldest AWC have heart rot.

DBH (inches): AWC : 11-16

Height (feet): AWC : 55-70

Age: AWC: 52-83+ (heart rot)

Basal Area (square feet): AWC: 90-150; Stand: 270; AWC coverage: 33-55%

Ownership: Private

Soil: Torhunta loam

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and NHP files

Wilson County

Wilson County contains one known site (WILS 01) consisting of a small grove of trees (0.3 acre) visible from US 264 at the Nash County line. This is probably the northwesternmost site in the state. The occurrence of AWC here is unusual considering the elevation, the general soil types of this region, and the long distance to other stands.

The stand occurs on Bibb loam at the headwaters of the Bloomery swamp (Juniper Creek), about 100 yards from a small man-made pond. The site contains four mature trees and a small thicket of saplings within a mature bay forest. Several trees were damaged by Hurricane Fran in 1996. AWC is codominant with tuliptree, red maple, and loblolly pine in this small site. Additional sapling AWC is visible along the right-of-way. Sweet bay, American holly, water oak, blaspheme vine, sweet pepperbush, and cane are in the understory. Upland hardwoods are immediately adjacent to the narrow floodplain.

WILSON COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - WILSON COUNTY

<u>Label Number</u>	<u>Site Name</u>
WILS 01	Juniper Junction

WILSON COUNTY

Juniper Junction - WILS 01

Site Size: 0.5 ac

AWC Size: 0.3 ac; scattered over stand

NHP EO Code: none

Location: On Juniper Creek along US 264 just south of the Nash County line.

Description: Mature bay forest along small creek dominated by red maple sweet bay, and yellow poplar with 4 canopy level AWCs. Additional grove of 50 AWC saplings to 35 feet tall in midstory with American holly, water oak, common greenbrier, sweet pepperbush, and cane. NCFS Prov. Site 32.

DBH (inches): AWC: 1-20

Height (feet): AWC: to 65

Age: AWC: to 60+

Basal Area (square feet): AWC: n/a; Stand: 60; AWC coverage: < 10%

Ownership: Private

Soil:

Natural Community Type: Bay Forest

Inspection Type: Ground

Sampson County

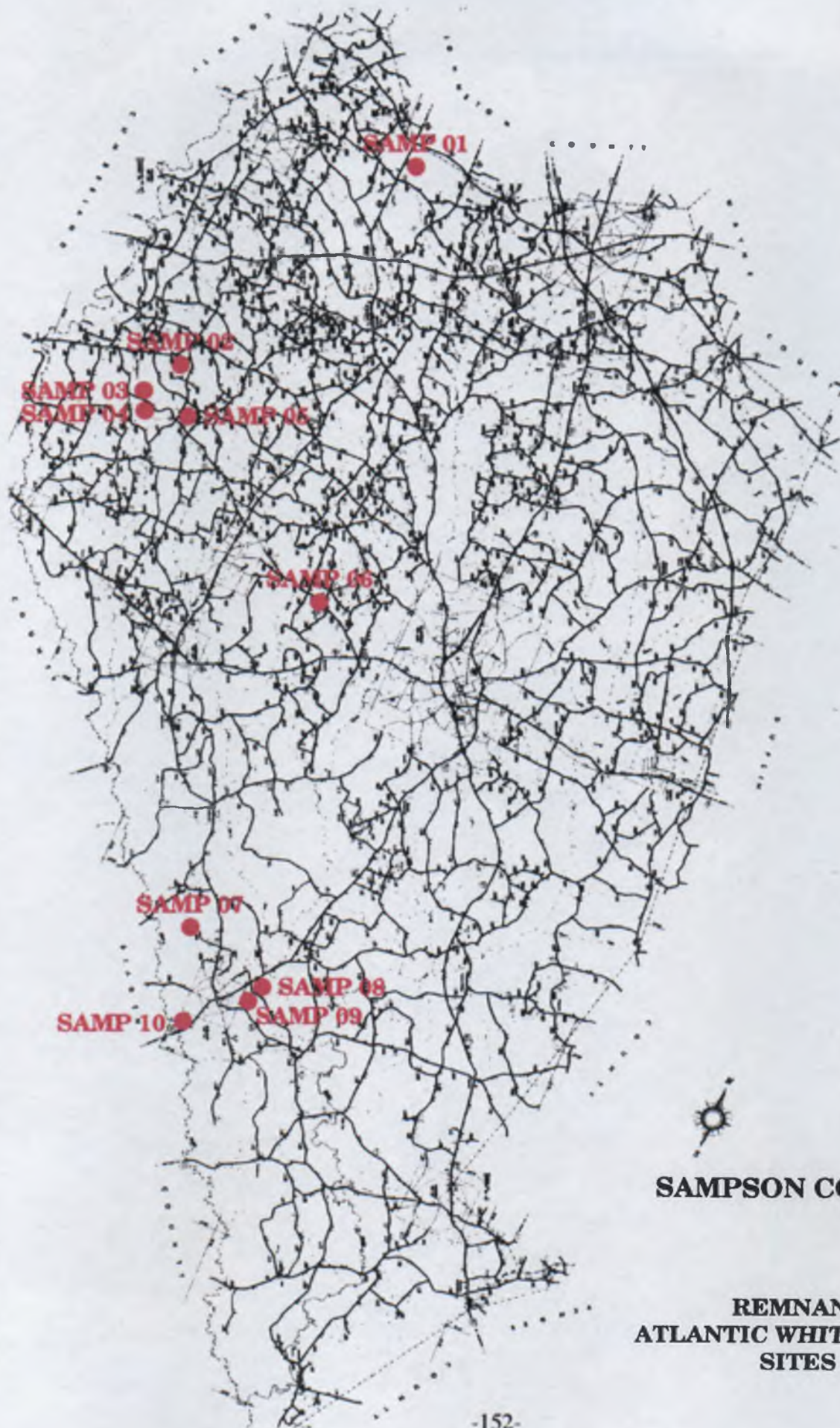
Sampson County has ten known AWC sites, many of which contain small patches of AWC mixed with hardwoods and pines for a total acreage of 19.5. Many of the sites have been cutover within the last 3-7 years. These cutovers contain dense pockets of AWC regeneration surrounded by dense pocosin vegetation; one cutover contains scattered regeneration over approximately 40 acres. Some contain remnant cedars 30-60 years old around their perimeter. These mature trees occur in 0.5 - 3 acre pockets that occupy 15-30% of the canopy within mixed hardwood or hardwood/pine communities. Comparatively, the quality of AWC communities in Sampson County is generally low.

Most of the sites occur just south of Garland or Rebel City (southwest of Salemburg). One site is between Salemburg and Clinton. All sites are in the southern part of the County within 2-5 miles of the South River.

Natural community types include Nonriverine Swamp Forest, Bay Forest, and Peatland Atlantic White Cedar. Common AWC associates include loblolly and pond pine, red maple, sweet bay, and tuliptree, of which the last occurs more frequently than in other counties. The understory typically contains bays, red maple, fetterbush, titi, gallberries, greenbriar, blaspheme vine, grape, and Japanese honeysuckle.

AWC sites occur on the following soil types: Torhunta, Paxville, and Woodington fine sandy loams, Bibb and Johnston loams, and Rains and Goldsboro loamy sands. According to the published soil survey, AWC also occurs on Leon sand and Lynn Haven sand, however, these are known to include inclusions of other soils more suited to AWC such as Tomahawk and Torhunta. Although poorly drained, the sandy loams and loamy sands in this county are somewhat better drained than the mucky soils on which AWC usually occurs in other counties. This could indicate that on these soils, AWC usually cannot outcompete other species and therefore is not found in pure stands. The better drained soils would also account for the greater abundance of tuliptree and honeysuckle than is found in AWC sites in other counties.

No stands are particularly noteworthy although many will provide opportunities to study natural regeneration.



SAMPSON COUNTY

**REMNANT
ATLANTIC WHITE-CEDAR
SITES**

Key to Remnant Atlantic White-cedar Inventory Sites - SAMPSON COUNTY

<u>Label Number</u>	<u>Site Name</u>
SAMP 01	Sprint Site
SAMP 02	Welcome School Road
SAMP 03	Cathead Road North
SAMP 04	Cathead Road South
SAMP 05	Rebel City
SAMP 06	Bonnetsville
SAMP 07	Elwell Road
SAMP 08	Lamb Road
SAMP 09	Garland
SAMP 10	South River

SAMPSON COUNTY

Sprint Site - SAMP 01

Site Size: 4 ac
AWC Size: < 1 ac
NHP EO Code: none
Location: On east side of Sprint Co. turnout; off NC 242, 0.25 mile south of Johnston County line.
Description: Recently cutover bay forest with widely scattered residual mature AWC, loblolly pine, and sweetgum.
DBH (inches): AWC residuals: 6-8
Height (feet): AWC residuals: 25
Age: AWC residuals: 15-40
Basal Area (square feet): AWC: n/a; Stand: n/a; AWC coverage: < 10%
Ownership: Private
Soil: Rains loamy sand and Pantego loam
Natural Community Type: Bay Forest
Inspection Type: Ground

Welcome School Road - SAMP 02

Site Size: < 0.5 ac
AWC Size: < 0.5ac
NHP EO Code: none
Location: Approx. 1 mile east of SR 1006 and 1441 (Welcome School Road) junction; 2 miles east of Clement..
Description: Small grove of mixed hardwoods with 4 AWCs.
DBH (inches): AWC: 3-8
Height (feet): AWC: 40
Age: AWC: 25
Basal Area (square feet): AWC: n/a; Stand: n/a; AWC coverage: < 10%
Ownership: Private
Soil: Bibb and Johnston
Natural Community Type: Bay Forest
Inspection Type: Ground

Cathead Road North - SAMP 03

Site Size: - <0.5 ac

AWC Size: <0.5 ac

NHP EO Code: none

Location: Approx. 0.75 mile east of SR 1430 and 1432 (Cathead Road) junction; on north side of SR 1432; east of Vickers.

Description: Small grove dominated by AWC with loblolly and pond pines and mixed hardwoods. Understory of fetterbush and titi. Scattered AWC regeneration.

DBH (inches): AWC : 4-8

Height (feet): AWC : 30-40

Age: AWC: 20

Basal Area (square feet): AWC: 60; Stand: 80; AWC coverage: 75%

Ownership: Private

Soil: Rains sandy loam and Goldsboro loamy sand

Natural Community Type: Pond Pine Woodland or Bay Forest

Inspection Type: Ground

Cathead Road South - SAMP 04

Site Size: 5-10 ac

AWC Size: 2 ac

NHP EO Code: none

Location: Approx. 0.75 mile east of SR 1430 and 1432 (Cathead Road) junction; on south side of SR 1432; east of Vickers.

Description: Recently cutover bay forest with 10-20 residual AWCs per acre. Shrubs dominate site and include inkberry, titi, fetterbush, and common greenbrier. Scattered AWC seedlings; most concentrated in skid trails; up to 700 per acre. Scattered AWC saplings.

DBH (inches): AWC residuals: 1-3

Height (feet): AWC residuals: 10-25

Age: AWC residuals: 10-20

Basal Area (square feet): AWC: n/a; Stand: n/a; AWC coverage: 75%

Ownership: Private

Soil: Rains sandy loam and Goldsboro loamy sand

Natural Community Type: Bay Forest

Inspection Type: Ground

Rebel City - SAMP 05

Site Size: <0.5 ac

AWC Size: <0.5 ac

NHP EO Code: none

Location: Approx. 0.5 mile west of Rebel City, southwest of bend in SR 1438; in western edge of bay just west of junction of SR 1438 and 1002.

Description: Recently cutover bay forest with residual mature AWC, loblolly pine, and mixed hardwoods. Some AWC residuals are now snags due to lightning damage. Scattered AWC seedlings and saplings along edge of bay.

DBH (inches): AWC residuals: 6-8

Height (feet): AWC residuals: 55

Age: AWC residuals: 15-40

Basal Area (square feet): AWC: 50; Stand: 80; AWC coverage: 62%

Ownership: Private

Soil: Rains and Woodington loamy sands

Natural Community Type: Bay Forest

Inspection Type: Ground

Bonnetsville - SAMP 06

Site Size: 1 ac

AWC Size: 1 ac

NHP EO Code: none

Location: Approx. 2 miles northwest of Bonnetsville on SR 1233; 0.25 mile southwest of junction of SR 1233 and SR 1318. AWC on northwest side of road.

Description: Young mature stand dominated by yellow poplar, sweetgum, red maple, and sweet bay with scattered AWC.

DBH (inches): AWC : 6-8

Height (feet): AWC : to 50

Age: AWC: 25-30

Basal Area (square feet): AWC: <5; Stand: 40; AWC coverage: <10%

Ownership: Private

Soil: Leon sand (inclusions likely include Tomahawk based on hydrology and species present)

Natural Community Type: Bay Forest

Inspection Type: Ground

Elwell Road - SAMP 07

Site Size: 0.5 ac

AWC Size: 0.5 ac

NHP EO Code: none

Location: Near terminus of SR 1204 (Elwell Road), approx. 2 miles north of Garland off NC 411.

Description: Mature forest in a wet depression dominated by loblolly pine and pond pine with codominant AWC. Dense understory of inkberry, fetterbush, titi, and common greenbrier. Scattered AWC on ground, likely due to Hurricane Fran (1996). Moderate amount of logging slash.

DBH (inches): AWC: 7-9

Height (feet): AWC: 38

Age: AWC: 32

Basal Area (square feet): AWC: 15; Stand: 50; AWC coverage: 30%

Ownership: Private

Soil: Torhunta fine sandy loam

Natural Community Type: Pond Pine Woodland

Inspection Type: Ground

Lamb Road - SAMP 08

Site Size: 40 ac

AWC Size: 10 ac; scattered over stand

NHP EO Code: none

Location: Just north of Garland on east side of US 701 approx. 0.25 mile south of SR 1135 (Lamb Road); between speed limit sign and gravel drive.

Description: Five year old cutover with scattered residual AWC. Regenerating AWC, loblolly pine, red maple, and sweet bay. AWC could become dominant or codominant. Dense inkberry, fetterbush, and other pocosin shrubs.

DBH (inches): AWC residuals: 5-7

Height (feet): AWC residuals: 45

Age: AWC residuals: 10-20

Basal Area (square feet): AWC: n/a; Stand: n/a; AWC coverage: <10%

Ownership: Private

Soil: Leon sand (inclusions likely include Tomahawk)

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Garland - SAMP 09

Site Size: 7.5 ac

AWC Size: 2.5 ac; scattered over stand

NHP EO Code: none

Location: Just north of Garland on east side of US 701 between 10th and 7th Streets; behind and beside residences.

Description: Mature bay forest dominated by red maple sweet bay, and red bay with codominant loblolly pine and AWC. Unmanaged area except for portions cleared for homesites and yards.

DBH (inches): AWC: 8-12

Height (feet): AWC: 45-50

Age: AWC: 30-40

Basal Area (square feet): AWC: 15; Stand: 90; AWC coverage: 17%

Ownership: Private

Soil: Lynn Haven sand (inclusions likely include Torhunta)

Natural Community Type: Bay Forest

Inspection Type: Ground

South River - SAMP 10

Site Size: 3 ac

AWC Size: 1 ac; small grove and scattered trees

NHP EO Code: none

Location: On US 701, 1 mile south of Garland and 0.5 mile west of South River; 0.8 mile south of SR 1200 junction. Stand is 150-200 feet from west side of road before powerline crossing; visible from road in winter.

Description: Mature forest dominated by tuliptree, loblolly pine, and red maple with 10 AWCs. Scattered AWC in vicinity including several snags. Dense understory of muscadine, common greenbrier, inkberry, and Japanese honeysuckle. Scattered AWC regeneration in open pockets. Additional scattered AWC in 0.5 acre area on east side of road with sweet bay, loblolly pine, pond pine, and red maple..

DBH (inches): AWC: 6-11

Height (feet): AWC: to 60

Age: AWC: 40-60

Basal Area (square feet): AWC: 15; Stand: 50; AWC coverage: 30%

Ownership: Private

Soil: Paxville fine sandy loam

Natural Community Type: Bay Forest

Inspection Type: Ground

Johnston County

Johnston County contains one known AWC site (JOHN 01) for a total acreage of 0.5. The site is very near the Johnston/Sampson County line along a blackwater creek and was heavily damaged by Hurricane Fran in 1996. Twelve cedars existed prior to the storm, all but one were toppled. The downed trees were 10-17 inches in diameter and held a heavy seed crop. Associated tuliptree, loblolly pine, sweetgum, red maple, and sweet bay were also downed. Scattered AWC regeneration is present.

JOHNSTON COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - JOHNSTON COUNTY

Label Number

Site Name

JOHN 01

Jumping Run

JOHNSTON COUNTY

Jumping Run - JOHN 01

Site Size: 0.5 ac

AWC Size: 0.5 ac

NHP EO Code: none

Location: Along NC 242 approx. 0.9 mi north of junction with NC 55 at Jumping Run bridge (south side of bridge); near Sampson County line.

Description: Formerly a grove of 12 AWC trees; all but one mature AWC blown down by Hurricane Fran (1996); most hardwoods also down. Scattered sweet bay, red maple, and tuliptree standing. Some AWC regeneration in grove, most near road. Dense understory of fetterbush, Japanese honeysuckle, and poison ivy. Dense slash; heavy seed crop in fallen AWC.

DBH (inches): AWC : previously 10-17

Height (feet): AWC : previously 60

Age: AWC remnant: 50+

Basal Area (square feet): AWC: <5; Stand: 20; AWC coverage: <10%

Ownership: Private

Soil: Bibb sandy loam

Natural Community Type: Transitional

Inspection Type: Ground

Harnett County

Harnett County contains two small AWC sites with scattered trees on Fort Bragg Military Reservation, and one unique stand in the southern part of the county near the Little River and Highway 401. AWC acreage totals 1.5. Soils include Portsmouth and Bibb loams.

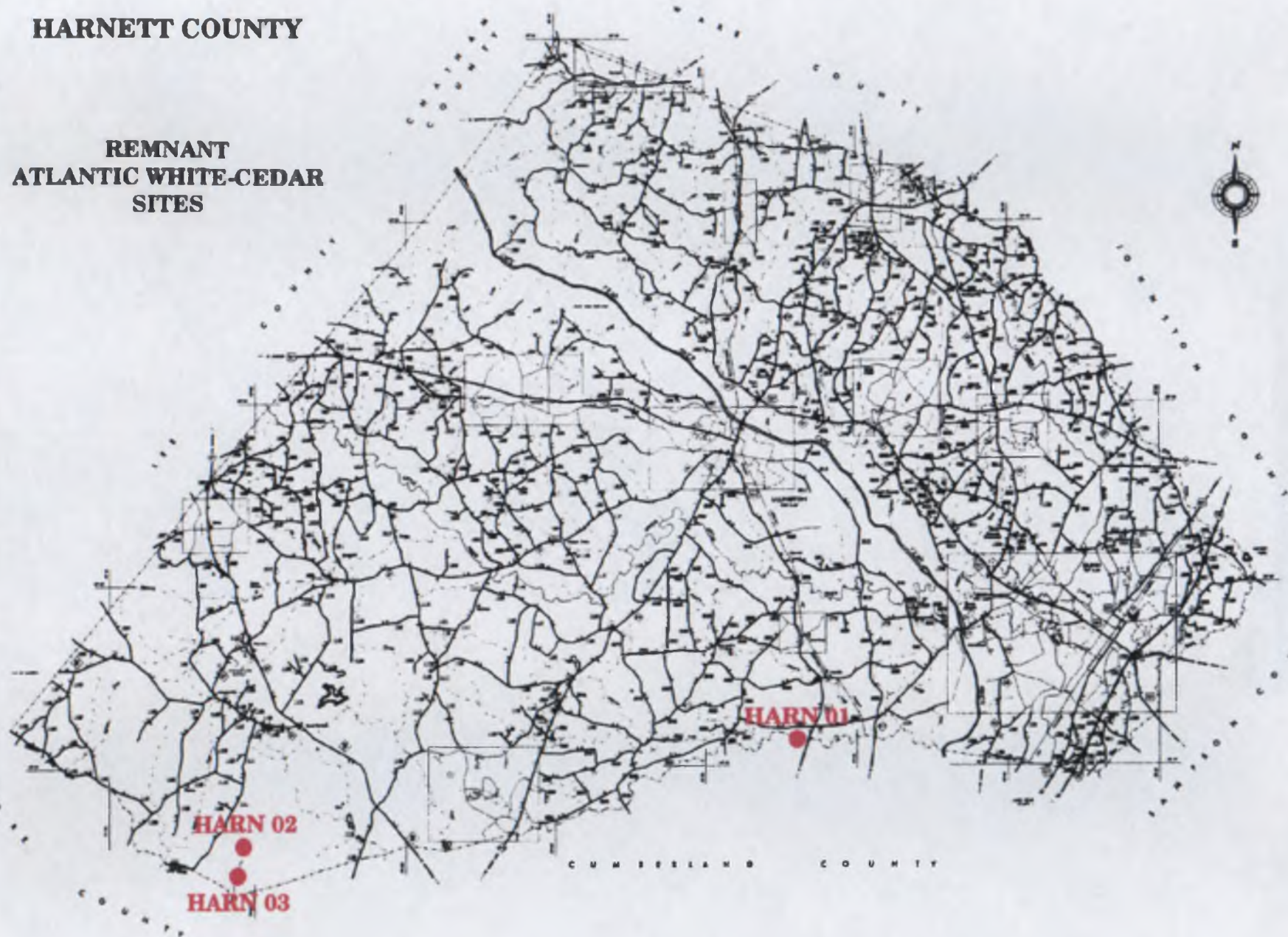
The Ft. Bragg sites (HARN 02 & 03) contain trees widely scattered in small groves and are classified as Streamhead Pocosins closely associated with drainages. These sites are dominated generally by loblolly pine or mixed hardwoods with the AWC occurring in depressions.

Site HARN 01, near the Little River, has a canopy aged 60-80 years dominated by AWC and covers less than 0.5 acre. Here, the AWC occurs in a distinct basin 4-5 feet below the level of the surrounding ground and is surrounded by recent cutovers. This site defies conventional classification but could be loosely categorized as a Streamhead Atlantic White Cedar community. There are few associates in the main canopy other than scattered loblolly pine and swamp black gum. The midstory contains a wide array of species, including sweet bay, red maple, mountain laurel, sourwood, swamp black gum, black cherry, American holly, titi, blackberry, honeysuckle, muscadine, and greenbrier. There are small pockets of AWC regeneration outside the basin but no significant amount inside. The basin appears to be seasonally flooded.

HARNETT COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES

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CUMBERLAND COUNTY

Key to Remnant Atlantic White-cedar Inventory Sites - HARNETT COUNTY

Label Number

Site Name

HARN 01

Josey Williams Road

HARN 02

Hector Creek

HARN 03

Hurley Lake

HARNETT COUNTY

Josey Williams Road - HARN 01

Site Size: 1 ac

AWC Size: 0.5 ac

NHP EO Code: none

Location: Along US 401 approx. 10 miles south of Lillington; 0.4 mile south of SR 2027 (Josey Williams Road) just north of Little River; lone AWC on west side of 401 marks site; stand approx. 1000 feet west of road in deep depression. Trees visible from road in homesite are red cedar.

Description: Basin dominated by mature AWC beginning to deteriorate. Midstory of sweet bay, loblolly pine, red maple, red oak, black cherry, and sourwood. Understory of common greenbrier, Japanense honeysuckle, blackberry, titi, mountain laurel, and American holly. Herbs include cane and peatmoss. Some AWC regeneration in groves on northern edge; none within basin. Small stream begins in basin.

DBH (inches): AWC : 8-16

Height (feet): AWC : to 73

Age: AWC to 80+

Basal Area (square feet): AWC: 60; Stand: 75; AWC coverage: 80%

Ownership: Private

Soil: Portsmouth loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground

Hector Creek - HARN 02

Site Size: 0.5 ac

AWC Size: <0.5 ac

NHP EO Code: none

Location: On Ft. Bragg along Hector Creek, north of Hurley Lake, just south of Firebreak 5; west of McRae Ride in Northern Training Area III.

Description: Small grove of AWC surrounded by loblolly pine and red maple. Midstory of dense hardwoods growing into canopy.

DBH (inches): AWC : 8-12

Height (feet): AWC : 70

Age: AWC to 75

Basal Area (square feet): AWC: ; Stand: ; AWC coverage: <10%

Ownership: Public (DOD - Ft. Bragg)

Soil: Bibb loam

Natural Community Type: Streamhead Pocosin

Inspection Type: Ground

Hurley Lake - HARN 03

Site Size: . 0.5 ac

AWC Size: 0.5 ac

NHP EO Code: Possibly 00665*013

Location: On Ft. Bragg along western side of Hurley Lake between Firebreaks 6 and 7; in Northern Training Area.

Description: Small grove of mixed hardwoods and pond pine with scattered AWC .

DBH (inches): AWC : 8-10

Height (feet): AWC : 50-55

Age: AWC 30-35

Basal Area (square feet): AWC: 20; Stand: 90; AWC coverage: 22%

Ownership: Public (DOD - Ft. Bragg)

Soil: Bibb loam

Natural Community Type: Streamhead Pocosin

Inspection Type: Ground

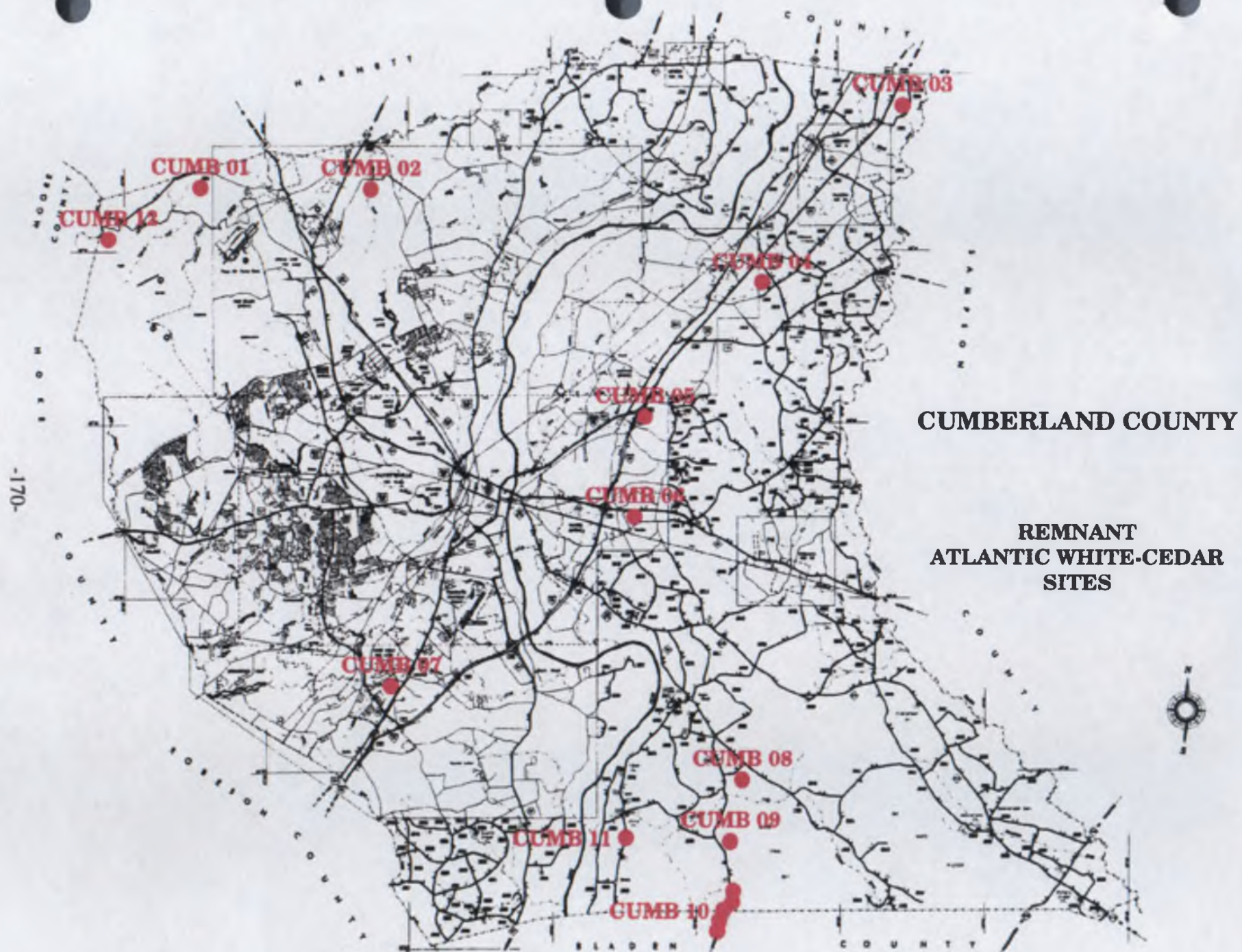
Cumberland County

Cumberland County contains thirteen 1-5 acre stands of fair quality AWC for a total acreage of 57.5. Most of these stands are mixed, with AWC occupying less than half of the canopy. Only two small sites could be considered pure. Overall, the stands are immature, ranging in age from 15-40 years. Older individual trees are found, though in most cases they are either residuals from a past harvest, or remnants left from a stand that has succeeded to hardwoods. Some of the relatively pure stands are parts of communities that contain scattered AWC over a larger area, often 5-20 acres. Two sites contain scattered AWC over 20-100 acres, however, neither has a pure, contiguous AWC canopy greater than 0.25 acre.

Most of the sites are in the east central and southern parts of the county. The stands typically occur within 5 miles of the eastern side of the Cape Fear River. Many sites are near the I-95 corridor and extend from the northern end of the County to the southern end. Of the sites west of the Cape Fear River, one is a small remnant stand along I-95, and several are small stands on Fort Bragg Military Reservation. For greater detail concerning Fort Bragg sites, see the section on Hoke County.

The Cumberland County AWC occurs in Streamhead Pocosins, Bay Forests, Nonriverine Swamp Forests, Peatland Atlantic White Cedar forests, and Pond Pine Woodlands. The AWC is often codominant with loblolly or pond pine, and, in the older sites, with tuliptree. Understories often include red bay, red maple, swamp black gum, sweetgum, fetterbush, dangleberry, gallberries, cane, and greenbrier. In transition zones, regeneration is occasionally mixed with longleaf pine and turkey oak. The majority of the sites occur on Torhunta and Lynn Haven soils, with parts of some stands also occurring on Croatan muck and Rains sandy loam.

One stand worth noting is Little Alligator Swamp (CUMB 10), recently cutover with scattered residual AWC as well as regenerating AWC on over 100 acres. A few young-mature trees have been left unharvested, as have numerous saplings. This is an extensive site, visible from a public road, that covers multiple soil and community types.



Key to Remnant Atlantic White-cedar Inventory Sites - CUMBERLAND COUNTY

<u>Label Number</u>	<u>Site Name</u>
CUMB 01	Overhills Estate
CUMB 02	Gibsons Creek
CUMB 03	Rhodess Pond Road
CUMB 04	Wade Road
CUMB 05	Eastover
CUMB 06	Vander Swamp
CUMB 07	Hope Mills
CUMB 08	Smith Road
CUMB 09	Bushy Lake
CUMB 10	Little Alligator Swamp
CUMB 11	Elease Power Station
CUMB 12	Salinas Point Terraces
CUMB 13	Ft. Bragg Military Reservation Megasite

CUMBERLAND COUNTY

Overhills Estate - CUMB 01

Site Size: 2 ac

AWC Size: 2 ac

NHP EO Code: 00665*004

Location: Overhills Estate, Townsend Unit; approx. 1 mile east of Ft. Bragg boundary, south of SR 1001.

Description: Mucky bottom cominated by AWC with some pond pine and tuliptree. Understory of AWC saplings, fetterbush, inkberry, sweet gallberry, and titi. Community reported in good condition with multi-age structure.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk ; AWC coverage: unk

Ownership: Private

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: NHP files; site not visited for this report.

Gibsons Creek - CUMB 02

Site Size: 2 ac

AWC Size: 2 ac

NHP EO Code: 00660*049

Location: On Ft. Bragg (NEA Commel Site); south of Firebreak 1, north of Johnsons Farm Road and west of Gibsons Creek.

Description: Streamhead pocosin flowing through narrow ravine dominated by pond pine, swamp black gum, tuliptree with scattered AWC. Understory of swamp black gum, inkberry, red maple, highbush blueberry, and blasphem vine. Herbs include well developed canebreak and cinnamon fern. Recent prescribed burns.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: unk

Ownership: Public (DOD - Ft. Bragg)

Soil: Gilead

Natural Community Type: Streamhead Pocosin

Inspection Type: NHP files; site not visited for this report.

Rhodess Pond Road - CUMB 03

Site Size: - < 1 ac
AWC Size: < 0.5 ac
NHP EO Code: none
Location: Site along east side of I-95 between Exits 65 and 70.
Description: Five sapling AWCs in cutover.
DBH (inches): AWC : 1-3
Height (feet): AWC : 10-20
Age: AWC: 5-8
Basal Area (square feet): AWC: n/a; Stand: n/a; AWC coverage: n/a
Ownership: Private
Soil:
Natural Community Type: Disturbed
Inspection Type: Ground

Wade Road - CUMB 04

Site Size: 3 ac
AWC Size: 1 ac
NHP EO Code:
Location: North of Fayetteville, along SR 1815 (Wade Road) approx. 200 feet east of I-95 Exit 61 and near KOA campground.
Description: Scattered pulpwood size AWC in canopy with loblolly pine. Mid- and understory of red maple, sweet bay, and sweetgum.
DBH (inches): AWC : 6-9
Height (feet): AWC : 50
Age: AWC: 25
Basal Area (square feet): AWC: < 10; Stand: 100; AWC coverage: < 10%
Ownership: Private
Soil: Rains sandy loam and Torhunta & Lynn Haven
Natural Community Type: Nonriverine Swamp Forest
Inspection Type: Ground

Eastover - CUMB 05

Site Size: 5 ac

AWC Size: 2 ac

NHP EO Code: none

Location: Along Reece Creek at mile post 56 on east side of I-95 near community of Eastover. Site is approx. 200 feet wide.

Description: Uneven-aged forest. Mature trees dominated by loblolly pine with widely scattered AWC groves. Midstory of sweet bay and red maple. Understory of inkberry, fetterbush, common greenbrier and sapling loblolly pine, AWC, water oak and sweetgum..

DBH (inches): AWC : 1-10

Height (feet): AWC : 8- 60

Age: AWC: 3-25

Basal Area (square feet): AWC: 20; Stand: 80; AWC coverage: 20%

Ownership: Private

Soil: Torhunta and Lynn Haven

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Vander Swamp - CUMB 06

Site Size: <0.5 ac

AWC Size: <0.5 ac

NHP EO Code: none

Location: Approx. 1 mile east of I-95 intersection with NC 24; along NC 24 in swampy area near community of Vander between Owen and Eastover

Description: Five individual AWCs with loblolly pine and mixed hardwoods along roadside.

DBH (inches): AWC : 8-11

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: n/a; Stand: n/a; AWC coverage: n/a

Ownership: Private

Soil:

Natural Community Type: Disturbed

Inspection Type: Ground

Hope Mills - CUMB 07

Site Size: 5 ac

AWC Size: 4 ac

NHP EO Code: none

Location: Along west side of I-95, approx. 1 mile north of NC 59 and 1 mile south of Hope Mills.

Description: Mature forest dominated by loblolly pine, tuliptree, and red maple with scattered AWC groves. Understory of sweet bay, red maple, swamp black gum, fetterbush, inkberry, common greenbrier, Japanese honeysuckle, and cane. Several sapling AWC groves within stand. Additional AWC regeneration in right-of-way.

DBH (inches): AWC : 1-14

Height (feet): AWC : 8- 65

Age: AWC: 3-65

Basal Area (square feet): AWC: 10; Stand: 50; AWC coverage: 20%

Ownership: Private

Soil: Torhunta and Lynn Haven

Natural Community Type: Streamhead Atlantic White Cedar transitioning to Bay Forest or Nonriverine Swamp Forest

Inspection Type: Ground

Smith Road - CUMB 08

Site Size: 4 ac

AWC Size: 1 ac

NHP EO Code: none

Location: Site just south of loblolly pine plantation along SR 2045 (Smith Road) south of Cedar Creek and NC 53.

Description: Dense groves of mature AWC. Midstory of sweet bay and red maple. Understory of dense inkberry, dangleberry, fetterbush, and common greenbrier. AWC have apparently been left amidst clearcut. Scattered downed AWC.

DBH (inches): AWC : 8-12

Height (feet): AWC : 50-60

Age: AWC: 40

Basal Area (square feet): AWC: 120; Stand: 120; AWC coverage: 100%

Ownership: Private

Soil: Torhunta and Lynn Haven

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

Bushy Lake - CUMB 09

Site Size: 50 ac

AWC Size: < 1 ac

NHP EO Code: none

Location: Site across from SR 2228 on east side of NC 53; 3-4 miles south of Cedar Creek.

Description: Maturing forest dominated by pulpwood-sized size AWC and sweetbay with dense understory of red bay, fetterbush and inkberry. Approx. 5-10 AWC per acre. No AWC regeneration. Site nearly impenetrable.

DBH (inches): AWC : 3-7

Height (feet): AWC : 20-40

Age: AWC: 15-20

Basal Area (square feet): AWC: 10; Stand: 30; AWC coverage: 30%

Ownership: Private (Bushy Lake Natural Area)

Soil: Torhunta and Lynn Haven

Natural Community Type: Bay Forest

Inspection Type: Ground

Little Alligator Swamp - CUMB 10

Site Size: 30 ac

AWC Size: 20 ac; scattered groves

NHP EO Code: none

Location: Site along west side of NC 53 at power line crossing between Bushy Lake Natural Area and Bladen County line.

Description: Extensive cutover with residual pulp size AWC which appear to have been intentionally spared; some sawtimber AWC have been cut. Approx. 100-200 AWC > 6" DBH per acre in groves of 10-20 trees with pond pine. Scattered AWC regeneration. Most of stand has dense understory of fetterbush, inkberry, and dangleberry. Transitions eastward to longleaf pine and turkey oak. Good opportunity to study AWC regeneration and/or experiment with fire and/or herbicide.

DBH (inches): AWC : 1-3

Height (feet): AWC : 10-20

Age: AWC: 5-8

Basal Area (square feet): AWC: n/a; Stand: n/a; AWC coverage: n/a

Ownership: Private

Soil: Torhunta and Lynn Haven with Croatan muck

Natural Community Type: Pond Pine Woodland

Inspection Type: Ground

Ft. Bragg Military Reservation Megasite - CUMB 13

Site Size: 20 ac

AWC Size: unk

NHP EO Code: 00665*013

Location: Ft. Bragg (Northern Training Area II); 150m west of McRae Ride Road between McRae Ride and Vass Road (SR 1001).

Description: Previously dominated by AWC, now a young, patchy stand of AWC, red maple, swamp black gum and pocosin shrubs. Extensive peatmoss mats. Degraded but has good recovery potential.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk ; Stand: unk; AWC coverage: unk

Ownership: Public (DOD - Ft. Bragg)

Soil: Torhunta and Lynn Haven

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: NHP files; site not visited for this report.

Hoke County

Hoke County contains 17 visited sites, 11 of which are on Fort Bragg Military Reservation (see Cumberland and Harnett Counties for other sites on Fort Bragg). Scattered or isolated single trees were observed along several drainages on Fort Bragg but are not included in this report. AWC known acreage totals 44. Most of the Hoke sites contain 0.5 to 4 acres of mixed AWC stands and groves. The remaining have widely scattered AWC.

The majority of the Hoke sites are in Fort Bragg's southwest portion (in the northwestern part of the County) and are closely associated with drainages. Other sites are in the central part of Hoke County, about 2 miles west of Raeford in the Highway 401/Raft Creek area.

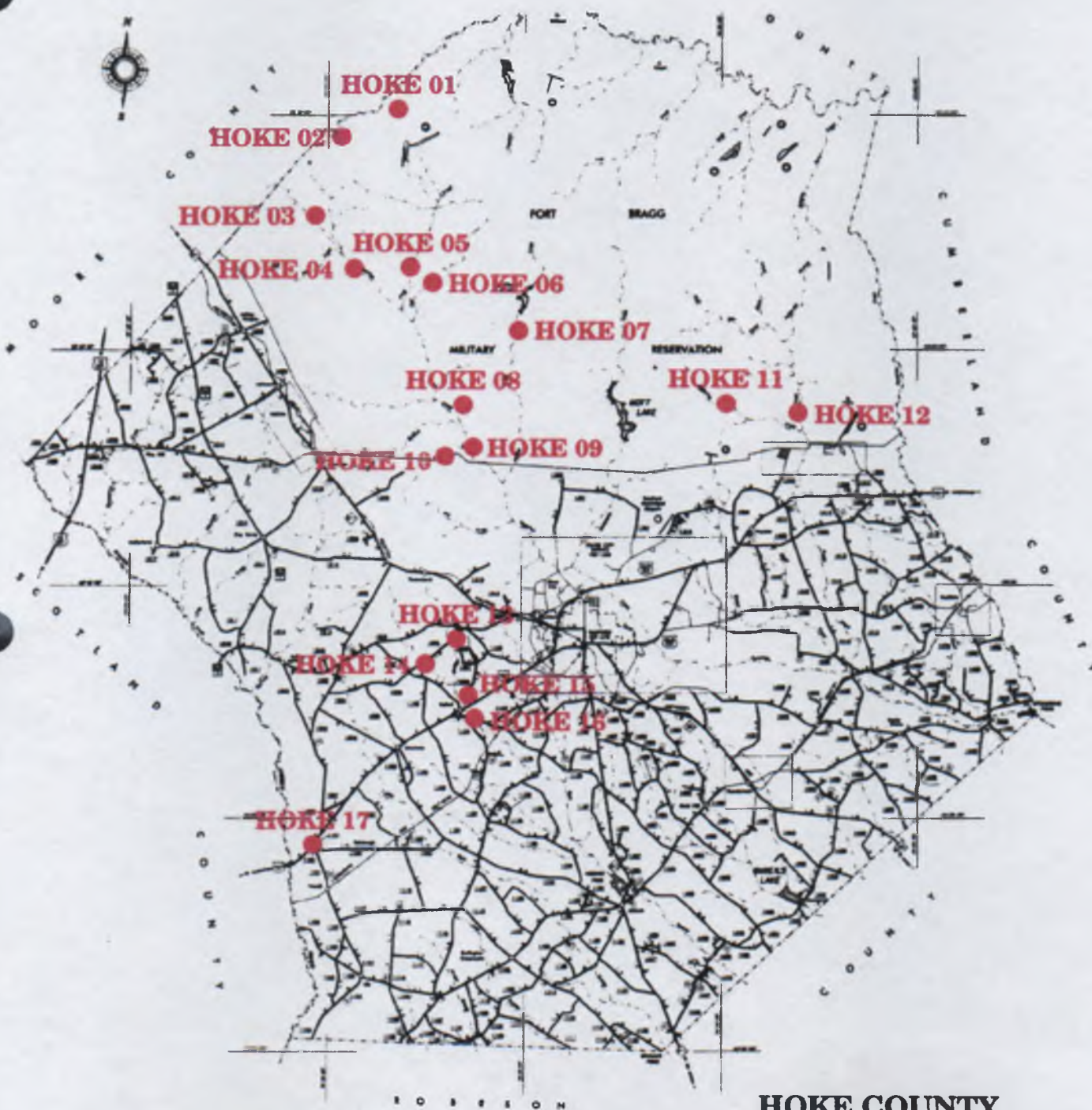
The AWC basal area for most sites is 20-50 square feet per acre. Several sites contain small, scattered groves of dense AWC with basal areas of up to 150-200 square feet per acre and are usually surrounded by non-AWC communities. There are five pure, intact stands on Fort Bragg (HOKE 1, 4, 6, 11, & 12), and one on private land (HOKE 17). These pure stands are mostly 2-5 acres in size with ages from 30-40 years or 70-80 years. Some trees in excess of 100 years were noted on Fort Bragg. One stand (HOKE 12) has an unusually wide range of ages represented in the canopy.

Many sites on the Fort have had fires burn into their edges and occasionally within their interiors. Some of these fires were naturally occurring, most were caused by ordnance or prescribed burning; the majority did not appear to be catastrophic. These fires have allowed for some regeneration to become established beyond the borders of the existing stands, often into sandy upland soils. Such scenarios provide study opportunities for the use of fire in AWC management.

Community types include Streamhead Atlantic White Cedar, Bay Forest, and Nonriverine Swamp Forest. The Streamhead AWC (though often not truly at streamheads) and Bay Forests are the most common. The Nonriverine Swamp Forest type occurs twice.

AWC associates include red maple, sweet bay, tuliptree, loblolly pine, swamp black gum, sweet gum, pond pine, water oak, American holly, and northern red oak. The last two species occurred on only one site each. The tuliptrees, as in other areas, are generally larger and older than the other hardwoods present. Understory species include red maple, fetterbush, gallberries, swamp doghobble, sweet pepperbush, titi, and blackberry. Herbs include cane, and, on many of the wet sites, peatmoss. The sites occur almost exclusively on Johnston loam. One site was observed on Torhunta and Lynn Haven soil.

Noteworthy sites include Calf Branch (HOKE 06), at 18 acres, the largest site in the county, and Wolf Pit Creek and Puppy Creek (HOKE 4 & 12), both of which are good examples of pure (though small) stands. The Puppy Creek site contains trees over 100 years.



HOKE COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES

Key to Remnant Atlantic White-cedar Inventory Sites - HOKE COUNTY

<u>Label Number</u>	<u>Site Name</u>
HOKE 01	James Creek Trail 2
HOKE 02	James Creek Trail 1
HOKE 03	Jennie Creek/Rockfish Creek
HOKE 04	Ft. Bragg Wolf Pit Creek
HOKE 05	Piney Bottom Creek
HOKE 06	Ft. Bragg Calf Branch Natural Area
HOKE 07	Juniper Creek, Bridge 86
HOKE 08	Bridge 95
HOKE 09	Rockfish at Plank
HOKE 10	Cabin Branch
HOKE 11	McDuffie Road
HOKE 12	Ft. Bragg Puppy Creek Natural Area
HOKE 13	Raft Creek C
HOKE 14	Raft Creek B
HOKE 15	Raft Creek A
HOKE 16	Raft Creek D
HOKE 17	Edinburgh Road

HOKE COUNTY

James Creek Trail 2 - HOKE 01

Site Size: 10 ac

AWC Size: 3.5 ac

NHP EO Code: none

Location: On Ft. Bragg along James Creek between Firebreaks 28 and 29; scattered trees continue to Break 33.

Description: Mature forest dominated by AWC. Mid- and understory of red maple, tuliptree, and sweet bay. Scattered inkberry and fetterbush. Intact stand; few dead AWC. Slight AWC regeneration along community edge.

DBH (inches): AWC : 8-14

Height (feet): AWC : 70-75

Age: AWC: to 75

Basal Area (square feet): AWC: 100; Stand: 100; AWC coverage: 100%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground

James Creek Trail 1 - HOKE 02

Site Size: 10 ac

AWC Size: 4 ac; scattered groves

NHP EO Code: none

Location: On Ft. Bragg at intersection of James Creek Trail and James Creek, between Firebreaks 27 and 28.

Description: Mature bay forest dominated by sweet bay and red maple. Scattered AWC groves and individual AWCs occupying 25-70% of the canopy; groves beginning to deteriorate. No AWC regeneration within groves; slight regeneration along community perimeter. Dense understory of red bay and fetterbush.

DBH (inches): AWC : 8-22

Height (feet): AWC : 75-80

Age: AWC: 72

Basal Area (square feet): AWC: < 10-70; Stand: 100; AWC coverage: < 10-70%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar transitioning to Bay Forest

Inspection Type: Ground

Jennie Creek/Rockfish Creek - HOKE 03

Site Size: - 5 ac

AWC Size: 1-2 ac; scattered groves and individual trees

NHP EO Code: 00665*009

Location: On Ft. Bragg east of confluence of Jennie and Rockfish Creeks; west of King Road between firebreaks 6 and 7.

Description: AWC groves in forest dominated by tuliptree, red maple, and sweet bay. AWC regeneration in open areas with 50-100 saplings per grove. Understory of red maple, fetherbush, inkberry, common greenbrier, and cane. Young mature forest dominated by AWC with midstory of red maple, sweet bay, and sweetgum. Dense understory of fetherbush, inkberry, and common greenbrier. Fifty AWC saplings per acre in open areas. Scattered saplings and seedlings in open areas.

DBH (inches): AWC : 4-12

Height (feet): AWC : 45-80

Age: AWC: 20-45

Basal Area (square feet): AWC: < 10; Stand: 80; AWC coverage: 12%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar (NHP records)

Inspection Type: Ground and NHP files.

Fort Bragg Wolf Pit Creek - HOKE 04

Site Size: 30 ac

AWC Size: 5 ac

NHP EO Code: 00665*005

Location: On Ft. Bragg along Wolf Pit Creek between Firebreaks 14 and 15.

Description: Moderately good quality stand of mature forest dominated by AWC with codominant swamp black gum, red maple, loblolly pine, pond pine, and swamp bay. Understory of sweet gallberry, fetherbush, and blaspheme vine. AWCs appear to have smaller than average crowns. Scattered groves of sapling AWC regeneration along edges and openings. Occasional firescars. near road.

DBH (inches): AWC : 5-14

Height (feet): AWC : 50-76

Age: AWC: 25-96

Basal Area (square feet): AWC: 80; Stand: 130; AWC coverage: 62%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground and NHP files.

Piney Bottom Creek - HOKE 05

Site Size: 1.5 ac

AWC Size: < 1 ac

NHP EO Code: 00665*007

Location: On Ft. Bragg at junction of Southern Pines Road and Piney Branch; at Firebreak 23 between Bridge 61 and 78.

Description: Formerly intact community dominated by AWC; currently much of AWC is dead; living basal area 10-20 square feet; living crown cover 10-15%. Scattered loblolly pine, red maple and sweet bay occupy canopy. Stand follows creek. Sand and silt wash from road evident.

DBH (inches): AWC : 6-10

Height (feet): AWC : 52

Age: AWC: 50

Basal Area (square feet): AWC: 10-20; Stand: 40; AWC coverage: 10-15%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar transitioning to Bay Forest

Inspection Type: Ground and NHP files.

Fort Bragg Calf Branch Natural Area - HOKE 06

Site Size: 40 ac

AWC Size: 18 ac

NHP EO Code: 00665*008

Location: On Ft. Bragg along Calf Branch southwest of McPherson Impact Area near Firebreaks 27 and 28.

Description: Excellent example of mature forest dominated by AWC with codominant swamp black gum, red maple, sweet bay, and tuliptree. Understory of fetterbush, inkberry, sweet gallberry, evergreen bayberry, titi, swamp bay, and tag alder. Herbs include netted chain-fern, Virginia chain-fern, royal fern, and cinnamon fern. Scattered sapling AWC along stand edge. Fire scars from lightning or ordnance.

DBH (inches): AWC : 10-24

Height (feet): AWC : 60-90

Age: AWC: 65-83

Basal Area (square feet): AWC: 110; Stand: 120 ; AWC coverage: 90%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground

Juniper Creek, Bridge 86 - HOKE 07

Site Size: 2 ac

AWC Size: 1 ac; scattered groves and trees

NHP EO Code: none

Location: On Ft. Bragg at Bridge 86 over Juniper Creek; between Firebreaks 16 and 17; most AWC upstream from bridge.

Description: Maturing forest dominated by red maple, sweet bay, tuliptree, sweetgum, and swamp black gum with scattered emergent AWC. Scattered AWC in mid-story. Understory of red bay, fetterbush, blaspheme vine, inkberry, and scattered sapling AWC. Approx. 10-12 mature AWC per acre. Several AWC snags. Peatmoss in patches. Old fire scars.

DBH (inches): AWC : 4-22

Height (feet): AWC : 50-84

Age: AWC: 20-107

Basal Area (square feet): AWC: 20; Stand: 80 ; AWC coverage: 25%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar transitioning to Bay Forest

Inspection Type: Ground

Bridge 95 - HOKE 08

Site Size: 1 ac

AWC Size: 1 ac

NHP EO Code: none

Location: On Ft. Bragg along Rockfish Creek, just north of Plank road and just west of the intersection of Firebreaks 7, 8, and 10 near Bridge 95.

Description: Mature bay forest dominated by red maple, tuliptree, and sweet bay with scattered AWC. Very dense understory of fetterbush, common greenbrier, and blackberry. Herbs include cane. Some AWC mortality. Fire scars around forest perimeter. No AWC regeneration.

DBH (inches): AWC : 8-20

Height (feet): AWC : to 78

Age: AWC: to 85

Basal Area (square feet): AWC: 15; Stand: 100; AWC coverage: 15%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar transitioning to Bay Forest

Inspection Type: Ground

Rockfish at Plank - HOKE 09

Site Size: < 1 ac

AWC Size: 0.5 ac

NHP EO Code: none

Location: On Ft. Bragg just south of Plank Road cutoff along Rockfish Creek; between Firebreaks 5 and 4 near Bridge 6.

Description: AWC grove surrounded by sweet bay and red maple. Some AWC regeneration around stand perimeter. Fire sign.

DBH (inches): AWC : 6-14

Height (feet): AWC : to 55

Age: AWC: to 40

Basal Area (square feet): AWC: < 10-70; Stand: 100; AWC coverage: < 10-70%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Bay Forest

Inspection Type: Ground

Cabin Branch - HOKE 10

Site Size: < 1 ac

AWC Size: < 0.5 ac; scattered trees

NHP EO Code: none

Location: On Ft. Bragg along Plank Road cutoff; west of Rockfish Creek; between Firebreaks 5 and 6 where Cabin Branch is near it's northernmost latitude.

Description: Young mature forest dominated by loblolly pine with scattered AWC trees. Mid- and understory of red bay, red maple, American holly, fetterbush, and swamp doghobble. Some AWC snags on ground. Scattered AWC regeneration. Fire scars on some pines.

DBH (inches): AWC : 8-11

Height (feet): AWC : to 48

Age: AWC: 25-30

Basal Area (square feet): AWC: 20; Stand: 100; AWC coverage: 20%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Bay Forest

Inspection Type: Ground

McDuffie Road - HOKE 11

Site Size: 4 ac

AWC Size: 3 ac

NHP EO Code: none

Location: On Ft. Bragg approx. 300 feet northwest of Bridge 114, along unlabeled Firebreak south of Firebreak 20.

Description: Good quality mature forest dominated by AWC with scattered pond pine and red maple. Understory of red maple, sweet bay, inkberry, and fetterbush. Some peatmoss. AWC densest in interior; edges beginning to deteriorate due to age. Some AWC regeneration around edge. Scattered fire scars.

DBH (inches): AWC : 10-17

Height (feet): AWC : 75-84

Age: AWC: to 70+

Basal Area (square feet): AWC: 220; Stand: 250; AWC coverage: 88%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground

Fort Bragg Puppy Creek Natural Area - HOKE 12

Site Size: 2 ac

AWC Size: 2 ac

NHP EO Code: 00665*006

Location: On Ft. Bragg approx. 400 feet north of Firebreak 4; along east side of Puppy Creek.

Description: Excellent example of mature forest dominated by AWC with codominant swamp black gum, loblolly pine, and tuliptree. Understory of swamp bay, American holly, fetterbush, inkberry, sweet gallberry, sweet pepperbush, red bay, swamp doghobble, and titi. Peatmoss abundant in areas. Slight AWC regeneration near road.

DBH (inches): AWC : 10-22

Height (feet): AWC : 60-85

Age: AWC: 50-113

Basal Area (square feet): AWC: 200; Stand: 240; AWC coverage: 83%

Ownership: Public (DOD - Ft. Bragg)

Soil: Johnston loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground and NHP files.

Raft Creek C - HOKE 13

Site Size: 2 ac
AWC Size: 0.5 ac; scattered trees
NHP EO Code: none
Location: At junction of SR 1206, SR 1203, and Raft Creek tributary; approx. 2 miles west of Raeford..
Description: Scattered AWC trees in mixed stand with sweet bay, tuliptree, and loblolly pine.
DBH (inches): AWC : 6-12
Height (feet): AWC : 40-50
Age: AWC: 35
Basal Area (square feet): AWC: 15; Stand: 60; AWC coverage: 25%
Ownership: Private
Soil: Johnston loam
Natural Community Type: Bay Forest
Inspection Type: Ground

Raft Creek B - HOKE 14

Site Size: 1 ac
AWC Size: 0.5 ac; scattered trees
NHP EO Code: none
Location: Along SR 1206 at westernmost tributary of Raft Creek, along west side of branch; approx. 2 miles west of Raeford.
Description: Scattered AWC trees in stand dominated by sweet bay, water oak, and loblolly pine.
DBH (inches): AWC : 6-10
Height (feet): AWC : 45-55
Age: AWC: 30-35
Basal Area (square feet): AWC: 20; Stand: 80; AWC coverage: 20%
Ownership: Private
Soil: Johnston loam
Natural Community Type: Streamhead Pocosin
Inspection Type: Ground

Raft Creek A - HOKE 15

Site Size: 3 ac

AWC Size: 1 ac; scattered groves

NHP EO Code: none

Location: On west side of US 401 between SR 1208 and Raft Creek; approx. 2 miles west of Raeford.

Description: Scattered AWC groves on a terrace on northeastern side of Raft Creek. Approx. 5-7

AWC trees per acre in canopy dominated by tuliptree and loblolly pine. Dense understory of fetterbush, inkberry, and common greenbrier. Herbs include panic grasses, various ferns and peatmoss.

DBH (inches): AWC : 6-17

Height (feet): AWC : to 65

Age: AWC: 25-60+

Basal Area (square feet): AWC: 20; Stand: 80; AWC coverage: 20%

Ownership: Private

Soil: Johnston loam

Natural Community Type: Nonriverine Swamp Forest

Inspection Type: Ground

Raft Creek D - HOKE 16

Site Size: 2 ac

AWC Size: 0.5 ac; scattered trees

NHP EO Code: none

Location: Along east side of US 401, approx. 2 miles west of Raeford between SR 1208 and Raft Creek.

Description: Scattered AWC trees in mixed stand with sweet bay, tuliptree, water oak, loblolly pine, swamp black gum, and red oak. Wetter than Raft Creek A-C. Half of AWC blown down by Hurricane Fran (1996). Dense understory of fetterbush, inkberry and Chinese privet around perimeter. Scattered saplings and seedlings in open areas.

DBH (inches): AWC : 6-10

Height (feet): AWC : to 65

Age: AWC: 30

Basal Area (square feet): AWC: 20; Stand: 60; AWC coverage: 30%

Ownership: Private

Soil: Johnston loam

Natural Community Type: Bay Forest

Inspection Type: Ground

Edinburgh Road - HOKE 17

Site Size: 2 ac

AWC Size: 1 ac

NHP EO Code: none

Location: Along east side of US 401, 0.5 mile east of Lumber River, immediately north and south of SR 1120.

Description: Young mature forest dominated by AWC with midstory of red maple, sweet bay, and sweetgum. Dense understory of fetterbush, inkberry, and common greenbrier. Fifty AWC saplings per acre in open areas. Scattered saplings and seedlings in open areas.

DBH (inches): AWC : 4-10

Height (feet): AWC : 50-60

Age: AWC: 30

Basal Area (square feet): AWC: 30; Stand: 40; AWC coverage: 75%

Ownership: Private

Soil: Torhunta and Lynn Haven

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground

Scotland County

Scotland County contains one reported site on Camp Mackall Military Reservation (SCOT 01) and one visited site on Sandhills Game Land (SCOT 02) for a total acreage of 5. Both sites are in the northern part of the county. The Sandhills site, classified as Peatland Atlantic White Cedar, is on a narrow terrace above a river and contains a small but pure stand of AWC and a stand of AWC mixed with loblolly and pond pine. The Camp Mackall site is a Streamhead Pocosin with scattered AWC. Both sites have mixed hardwood understories with typical pocosin shrubs. The Sandhills site contains some large cedars (8-24 inch diameters); one tree has a diameter of 30 inches.

SCOTLAND COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - SCOTLAND COUNTY

Label Number

Site Name

SCOT 01
SCOT 02

Camp Mackall Military Reservation
Silver Hill

SCOTLAND COUNTY

Camp Mackall Military Reservation - SCOT 01

Site Size: 15 ac

AWC Size: unk

NHP EO Code: 00660*061

Location: On Camp Mackall (Training Area LL); south of Big Muddy Lake.

Description: Streamhead pocosin dominated by pond pine, swamp black gum, sweetgum and red maple with scattered AWC. Mid- and understory of inkberry, sweet gallberry, sweet pepperbush, swamp black gum, tag alder, and red maple. Herbs include cane, cinnamon fern, Virginia chain-fern, and peatmoss.

DBH (inches): AWC: unk

Height (feet): AWC: unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: unk

Ownership: Public (DOD - Camp Mackall)

Soil:

Natural Community Type: Streamhead Pocosin

Inspection Type: NHP files; site not visited for this report.

Silver Hill - SCOT 02

Site Size: 10 ac

AWC Size: 5 ac

NHP EO Code: 00645*013

Location: On Sandhills Game Land; along Drowning Creek just north of SR 1412.

Description: Mature forest on narrow terrace along creek dominated by AWC with codominant loblolly and pond pine. Understory of red maple, sweet bay, highbush blueberry, fetterbush, red bay, inkberry, sweet gallberry, and sweet pepperbush. Pines dominate AWC on the upslope. AWC appears healthy.

DBH (inches): AWC: 8 -24

Height (feet): AWC: 55-74

Age: AWC: 60-80

Basal Area (square feet): AWC: 50; Stand: 90; AWC coverage: 56%

Ownership: Public (NCDEHNR - Sandhill Game Land)

Soil: Rutlege

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and NHP files.

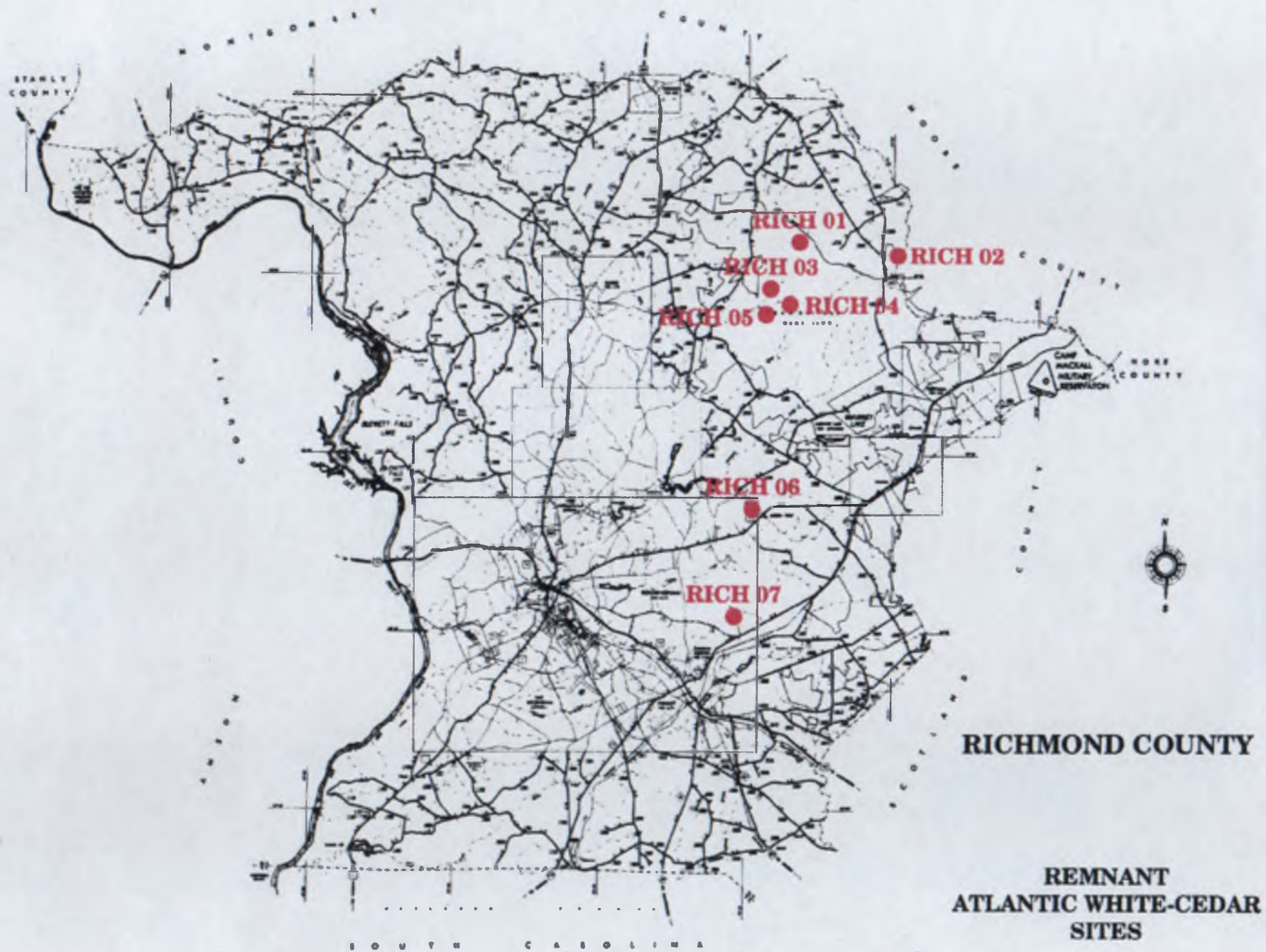
Richmond County

Richmond County contains five visited sites and two others reported from NHP records for a total acreage of 11. Most of the sites are in the Sandhills Game Land in the northeastern part of the county. Two sites are near Hamlet and Rockingham in southcentral Richmond County. Stand sizes are generally 1-4 acres. On several visited sites, surrounding communities up to 10 acres in size contain widely scattered AWC. The NHP reports a community covering 55 acres.

Five of the stands contain fairly pure AWC or at least contain pockets of pure AWC. The remaining two mixed stands with AWC comprising <10-17% of the basal area. The trees are roughly middle-aged, generally 20-55 years old. Most stands do not include much seedling regeneration, although several contain patches of saplings up to 20 years old that have become established in canopy gaps. Some stands sustained minor Hurricane Fran damage.

The stands are representative of their community types for this region. Five are the Streamhead Atlantic White Cedar type, one is Streamhead Pocosin and one is Peatland Atlantic White Cedar. Common associates include pond and loblolly pine, red maple, swamp black gum, sweet bay, and tuliptree. The understories are generally dense and contained sweet bay, red bay, fetterbush, cane, gallberries, dangleberry, sweet pepperbush, and blaspheme vine. Water oak was observed on one site. Peatmoss was present on several sites. Pitcher plants were reported on one site but not observed.

Noteworthy sites include the Naked Creek White Cedar Stand (RICH 01) which is an excellent example of a mature AWC stand with pockets of regeneration. Additionally, the Millstone Creek site (RICH 03) has pockets of saplings surrounding old AWC stumps and some regeneration advancing upslope into sandy soil.



Key to Remnant Atlantic White-cedar Inventory Sites - RICHMOND COUNTY

<u>Label Number</u>	<u>Site Name</u>
RICH 01	Naked Creek White Cedar Stand
RICH 02	White Cedar Branch Head
RICH 03	Millstone Creek
RICH 04	Sandhills Game Land A
RICH 05	Sandhills Game Land B
RICH 06	Chock Creek
RICH 07	Hogan Road

RICHMOND COUNTY

Naked Creek White Cedar Stand - RICH 01

Site Size: 55 ac (NHP acreage; "uncertain")

AWC Size: unk

NHP EO Code: 00665*001

Location: In Sandhills Game Land, on south side of Naked Creek between A-6 Lane and Baggetts Lake Lane, 1.5 - 2.5 miles downstream from SR 1424.

Description: Excellent quality forest dominated by AWC and pond pine; many trees exceed 20" DBH. AWC and pond pine reproducing in canopy gaps; forming an uneven-aged forest. Dense understory of fetterbush, sweet gallberry, inkberry, and swamp bay. Peatmoss abundant near upland edge where seepage occurs.

DBH (inches): AWC: to 20+

Height (feet): AWC: unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 50+ %

Ownership: Public (NCDEHNR - Sandhills Game Land)

Soil: Johnston mucky loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: NHP files; site not visited for this report.

White Cedar Branch Head - RICH 02

Site Size: unk

AWC Size: unk

NHP EO Code: 00665*002

Location: In Sandhills Game Land, between Drowning Creek and SR 1003, 1 mile north of SR 1003 junction with SR 1473.

Description: Small stand of AWC and pond pine with some swamp black gum. Abundant AWC regeneration. Dense pocosin understory includes fetterbush, inkberry, and sweet gallberry.

DBH (inches): AWC: 18-20

Height (feet): AWC: unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand:unk; AWC coverage: 50+ %

Ownership: Public (NCDEHNR - Sandhills Game Land)

Soil: Johnston mucky loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: NHP files; site not visited for this report.

Millstone Creek - RICH 03

Site Size: 9 ac

AWC Size: 4 ac

NHP EO Code: 00665*003

Location: In Sandhills Game Land, along Millstone Creek, southwest of the junction of SR 1455 (Firetower Lane), 0.6 mile east of the firetower.

Description: Mosaic of AWC, red maple, tuliptree, sweet bay, swamp black gum and pond pine along creek. Canopy density of AWC ranges from 10-60%. Midstory of red maple, swamp black gum, and sweet bay. Dense understory of fetterbush, inkberry, dangleberry, and red maple. Herbs include cane and dense peatmoss. Large AWC snags and stumps with fire scars. Scattered AWC saplings around old stumps; some AWC regeneration advancing upslope into sandy soil.

DBH (inches): AWC: to 6-12

Height (feet): AWC: to 60

Age: AWC: to 55

Basal Area (square feet): AWC: 40; Stand: 90; AWC coverage: 50%

Ownership: Public (NCDEHNR - Sandhills Game Land)

Soil: Candor & Wakulla

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground and NHP files.

Sandhills Game Land A - RICH 04

Site Size: 1 ac

AWC Size: 0.5 ac

NHP EO Code: none

Location: In Sandhills Game Land; from SR 1455 follow first unmarked road east of Ellerbe firetower 0.75 mile to creek crossing; site mainly along east side of road.

Description: Grove of young mature AWC occupying approx. 50% of canopy; grove interior nearly 100%; edges mixed with pond pine, red maple, and swamp black gum. Understory of red maple, swamp black gum, fetterbush, sweet pepperbush, dangleberry, and sweet bay. Herbs include cane and various ferns. Some AWC damaged by Hurricane Fran (1996). Slight seedling regeneration is small (1 sq.ft.) spots where soil has been disturbed and is exposed to sunlight.

DBH (inches): AWC: 4-19

Height (feet): AWC: 60-66

Age: AWC: to 54

Basal Area (square feet): AWC: 110; Stand: 130; AWC coverage: 85%

Ownership: Public (NCDEHNR - Sandhills Game Land)

Soil: Johnston mucky loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground

Sandhills Game Land B - RICH 05

Site Size: 1 ac

AWC Size: 1 ac

NHP EO Code: Possibly part of 00665*003

Location: In Sandhills Game Land, from SR 1455 follow first unmarked road east of Ellerbe firetower 0.5 mile to first curve; trees inside curve..

Description: Grove of young mature AWC occupying approx. 50% of canopy mixed with pond pine. Midstory of red maple and swamp black gum. Dense understory of fatterbush and inkberry.

DBH (inches): AWC: 8-12

Height (feet): AWC: to 50

Age: AWC: 20-35

Basal Area (square feet): AWC: 40; Stand: 80; AWC coverage: 50%

Ownership: Public (NCDEHNR - Sandhills Game Land)

Soil: Johnston mucky loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground

Chock Creek - RICH 06

Site Size: 2 ac

AWC Size: 2 ac

NHP EO Code: none

Location: Along the north side of US 701 at Chock Creek junction; approx. 4 miles west of Cognac between Rockingham and racetrack; most of site across from a beaver pond on west side of creek.

Description: Intact stand of young mature AWC with codominant loblolly pine. Midstory of red maple and sweet bay. Dense understory of fatterbush, blaspheme vine, water oak, and swamp black gum. Pitcher plants reported but not observed. Area surrounded by loblolly pine.

DBH (inches): AWC: 6-13

Height (feet): AWC: 55-60

Age: AWC: 40-45

Basal Area (square feet): AWC: 60; Stand: 110; AWC coverage: 54%

Ownership: Private

Soil: Candor & Wakulla

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground

Hogan Road - RICH 07

Site Size: - 8 ac

AWC Size: 3.5 ac

NHP EO Code: none

Location: East and west of unimproved SR 1700 (Hogan Road), north of NC 177 junction; 3 miles north of Hamlet; south of the railroad switchyards.

Description: Young pulpwood-sized and sapling AWC stand; most AWC are 4-10" DBH mixed with red maple, swamp black gum and scattered emergent loblolly pine and tuliptree. Dense understory of fetterbush, blaspheme vine, dangleberry, red bay and scattered sourwood. Site will likely mature to AWC. Some lonleaf pine along southern edge. Scattered dead AWC in western portion - flooding due to road construction a possible factor.

DBH (inches): AWC: 2-10

Height (feet): AWC: 30-45

Age: AWC: 20-30

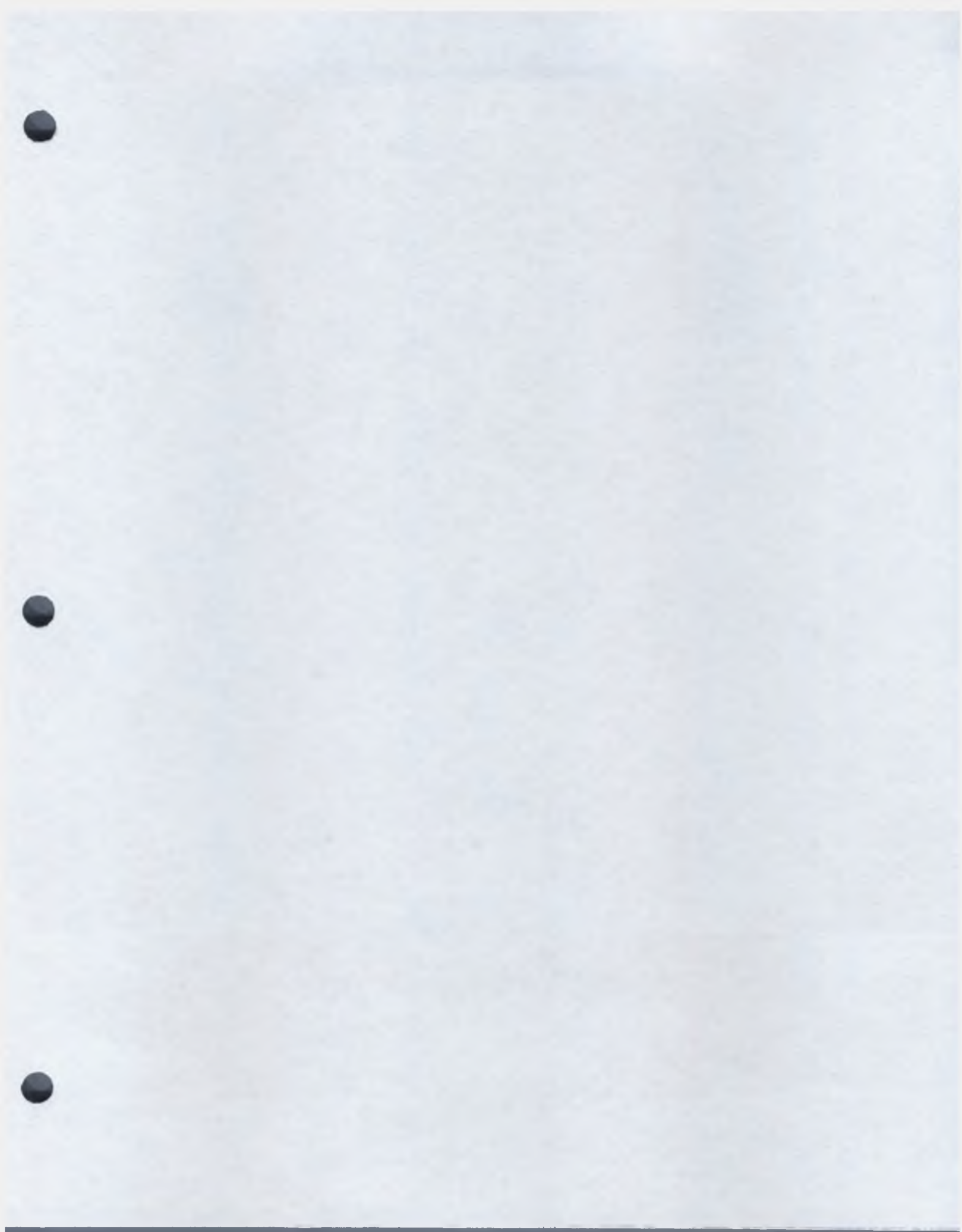
Basal Area (square feet): AWC: 50; Stand: 80; AWC coverage: 63%

Ownership: Private

Soil:

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground



Moore County

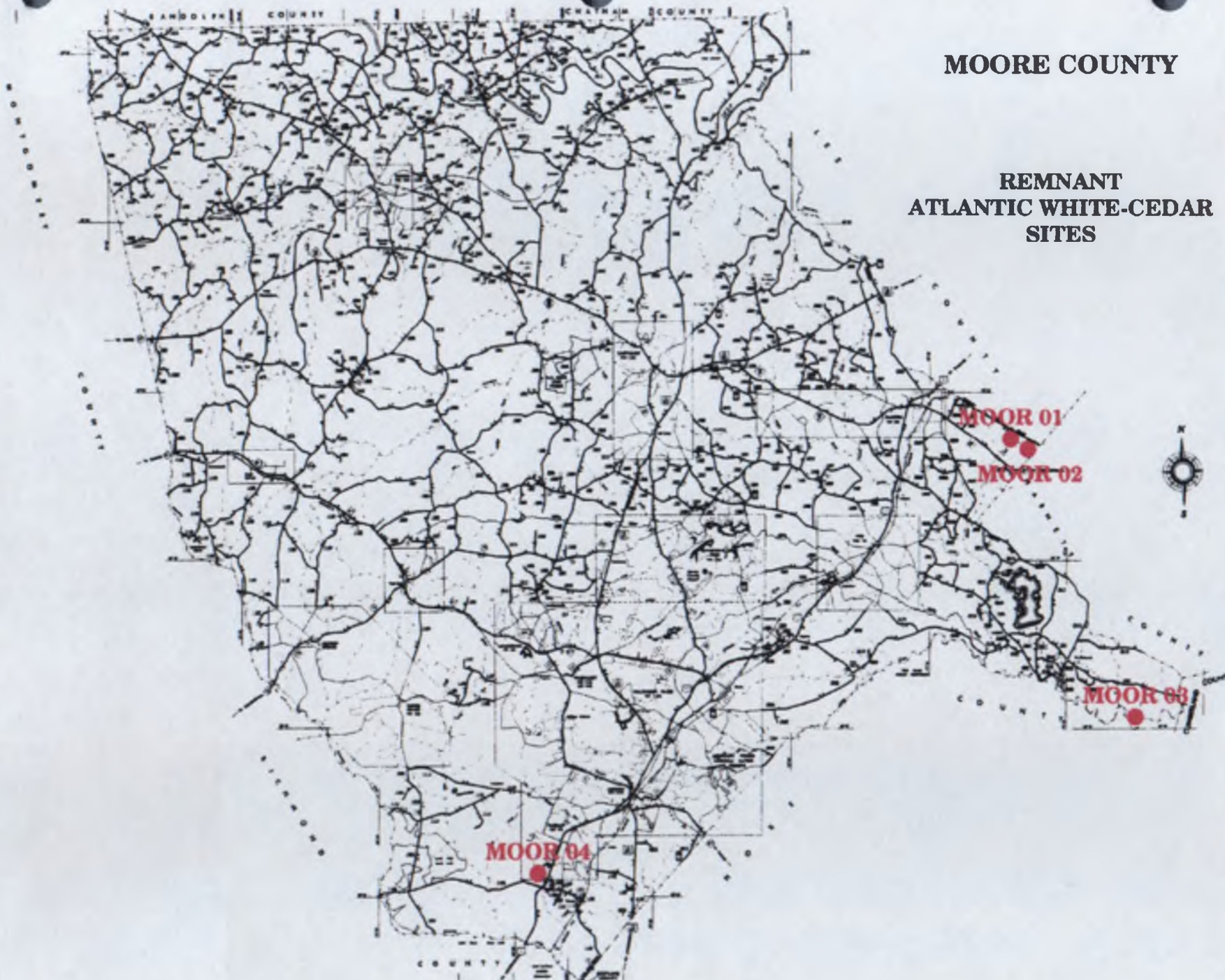
Moore County contains four known AWC sites with a total acreage of 37.5. Two sites occur in the easternmost part of the county at the Lee/Harnett corner, one at the Hoke/Harnett/Cumberland corner, and one in the southern portion north of the Richmond County line. Stands range from less than 10 acres to over 20 acres with the largest on Fort Bragg Military Reservation. The stands are relatively pure to very pure in places with ages from 10-15 years to over 40 years.

Community types include Peatland Atlantic White Cedar and Streamhead Atlantic White Cedar. Associates include red maple, sweet bay, swamp black gum, tuliptree, loblolly pine, and pond pine. The understories include fetterbush, red maple, bay, gallberries, and blaspheme vine.

Noteworthy sites include the Turkey Creek site (MOOR 03) and the County Line Road Cedar Stands A & B (MOOR 01 and 02). MOOR 03 is described in the NHP records as "one of the largest and perhaps most intact Atlantic White Cedar swamps on Fort Bragg." MOOR 01 and 02 are part of a much larger stand that also occurs in Lee County and is described in the NHP records as "one of the highest quality Streamhead Atlantic White Cedar Forest occurrences". Roughly half of the AWC in MOOR 01 was damaged by Hurricane Fran in 1996.

MOORE COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - MOORE COUNTY

Label Number

Site Name

MOOR 01

County Line Road Cedar Stand A

MOOR 02

County Line Road Cedar Stand B

MOOR 03

Ft. Bragg Turkey Creek Natural Area

MOOR 04

Pinebluff Lake

MOORE COUNTY

County Line Road Cedar Stand A - MOOR 01

Site Size: 9 ac

AWC Size: 8 ac

NHP EO Code: (Site Code) S.USNCHP*1750

Location: Along SR 1172 (County Line Road), approx. 0.5 mile west of Harnett County line; along south side of road and across from loblolly pine plantation. Separated from County Line Road C (LEE 02) by road; immediately west of County Line Road Cedar Stand B (MOOR 02).

Description: Good quality forest dominated by AWC with codominant loblolly pine, red maple, and sweet bay. Basal area approx. 200 before Hurricane Fran (1996): now 100. Understory of dangleberry, fetterbush, inkberry, sweet gallberry, blaspheme vine, wax myrtle, and sweet pepperbush. Herbs include various ferns and peatmoss. Stand appears to pond seasonally. Hardwood regeneration around downed trees; slight AWC seedling regeneration.

DBH (inches): AWC: 10 -17

Height (feet): AWC: 60-75

Age: AWC: 50+

Basal Area (square feet): AWC: 125; Stand:140; AWC coverage: 90%

Ownership: Private

Soil: Bibb loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground

County Line Road Cedar Stand B - MOOR 02

Site Size: 7 ac

AWC Size: 4 ac

NHP EO Code: (Site Code) S.USNCHP*1750

Location: Along SR 1172 (County Line Road), approx. 0.5 mile west of Harnett County line; along south side of road at eastern end of AWC mosaic; just before loblolly pine plantation. Separated from County Line Road C (LEE 02) by road; immediately east of County Line Road Cedar Stand A (MOOR 01).

Description: Good quality forest dominated by dense sapling and pulpwood-sized AWC (1000 trees per acre) with codominant red maple and sweet bay. Stand probably cut 15-20 years ago. Entire stand appears to flood seasonally.

DBH (inches): AWC: 1-4

Height (feet): AWC: 20-30

Age: AWC: 15-20

Basal Area (square feet): AWC: n/a; Stand:n/a; AWC coverage: 60%

Ownership: Private

Soil: Bibb loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground

Ft. Bragg Turkey Creek Natural Area - MOOR 03

Site Size: 40 ac

AWC Size: 25 ac

NHP EO Code: 00645*016

Location: On Ft. Bragg (Northern Training Area I); between Gravel Pit Road and Lower River Road; along Turkey Creek.

Description: According to NHP, could be one of largest and most intact AWC swamps on Ft. Bragg. Mature forest dominated by AWC with codominants swamp black gum, red maple, tuliptree, loblolly pine and widely scattered pond pine. Understory of sweet bay, sweet gallberry, swamp bay, titi, blaspheme vine, fetterbush, swamp doghobble, and blackberry. Herbs include cinnamon fern, Virginia chain-fern and peatmoss. Scattered hummocks.

DBH (inches): AWC: 10-20

Height (feet): AWC: 75-85

Age: AWC: 40+

Basal Area (square feet): AWC: 30-200; Stand: 100-200; AWC coverage: 30-100%

Ownership: Public (DOD - Ft. Bragg)

Soil: Bibb loam

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and NHP files.

Pinebluff Lake - MOOR 04

Site Size: 10 ac

AWC Size: 0.5 ac

NHP EO Code: none

Location: In southern Moore County, 4 miles north of Richmond County, 2 miles southwest of Pinebluff, on south side of Pinebluff Lake between the lake and Silver Spring.

Description: Mature grove with scattered AWC, (swamp?) black gum, and highbush blueberry in swale, grading into longleaf pine and blackjack oak on the sandhill upslope. Groves of regenerating AWC surround the mature grove.

DBH (inches): AWC: 6-15

Height (feet): AWC: unk

Age: AWC: to 50+

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: 20%

Ownership: Private

Soil:

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Landowner communication.



Lee County

Lee County contains two known AWC sites for a total acreage of 19. The Juniper Springs Church Natural Area (LEE 01) occurs in a depression, while the County Line Road White Cedar Stand C (LEE 02) is part of a large high quality stand that straddles the Moore County line. LEE 01 is a mixed stand with AWC being a minor component; LEE 02 contains fairly pure AWC. The trees in both stands are mature with ages ranging from 40 to 80 years.

Both sites are classified as Streamhead Atlantic White Cedar. The LEE 01 depression is 10-15 feet below the level of the surrounding ground with hydrology driven by seeps in the steep hillsides and by a small drain. The soil is a muck over small gravel. Tree ages and diameters decrease toward the rim of the depression. This could indicate that the cedars established in the center and spread outward (K.O. Summerville, pers. comm.).

The LEE 02 stand is part of a larger stand occurring mostly in Moore County. The total stand contains over 20 acres dominated by AWC. The Moore County portions incurred Hurricane Fran damage, but the LEE 02 trees are mostly intact. The site is categorized as pure with AWC comprising roughly half of the basal area. This stand is described by the NHP as "one of the highest quality Streamhead Atlantic White Cedar Forest occurrences".

Lee County associates include loblolly pine, red maple, sweet bay, swamp black gum, pond pine, and tuliptree. The understory includes highbush blueberry, swamp honeysuckle, cane, blackberry, sweet pepperbush, American holly, blaspheme vine, Virginia creeper, cinnamon fern, and peatmoss.

LEE COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES

-210-



Key to Remnant Atlantic White-cedar Inventory Sites - LEE COUNTY

Label Number

Site Name

LEE 01

Juniper Springs Church Natural Area

LEE 02

County Line Road White Cedar Stand C

LEE COUNTY

Juniper Springs Church Natural Area - LEE 01

Site Size: 12 ac

AWC Size: 12 ac

NHP EO Code: 00665*012

Location: South of junction of SR 1538 and 1543 near Juniper Springs Church, approx. 0.5 mile west of Harnett County line.

Description: Mature forest dominated by tuliptree, loblolly and pond pine, swamp black gum and AWC. Tuliptrees and AWC have DBH of 20+. Mature trees occur in a depression behind church; AWC condition declining near center of depression. Understory of red bay, inkberry, sweet bay, sweet pepperbush, highbush blueberry, swamp honeysuckle, blackberry, common greenbrier, and American holly. Herbs include cane, cinnamon fern and peatmoss. Catfaces on longleaf stumps. Hydrology driven by seeping water from steep depression sides and small creek. Slight AWC regeneration. NCFS and landowner have discussed herbicide use to promote regeneration.

DBH (inches): AWC : 12-22

Height (feet): AWC : to 74

Age: AWC: 80+

Basal Area (square feet): AWC: 30; Stand: 100; AWC coverage: 30%

Ownership: Private (registered as Natural Area)

Soil: Vaocluse gravelly sandy loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground and NHP files.

County Line Road White Cedar Stand C - LEE 02

Site Size: 7 ac

AWC Size: 7 ac

NHP EO Code: (Site Code) S.USNCHP*1750

Location: Along north side of SR 1172 (County Line Road) at Lee and Moore boundary; 0.5 mile west of Harnett County line; just east of loblolly plantation. Saplings visible from road. Separated from County Line Road White Cedar Stand A&B (MOOR 01 & 02) by road.

Description: Mature forest dominated by AWC with codominant loblolly pine. Midstory of red maple and sweet bay. Understory of dangleberry, inkberry, and sweet gallberry. Scattered AWC stumps and downed logs. Hardwoods growing into canopy.

DBH (inches): AWC : 8-14

Height (feet): AWC :

Age: AWC: to 50+

Basal Area (square feet): AWC: 100; Stand: 180; AWC coverage: 55%

Ownership: Private

Soil: Wehadkee fine sandy loam

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground

Bladen County

Bladen County contains nine known stands of relatively pure AWC for a total acreage of 50.5. Several sites with widely scattered trees and 4-5 sites with young plantations were not included in the survey. The known sites occur within 1-5 miles of the northern side of the Cape Fear River which runs from northwest to southeast through the County.

Most of the AWC is concentrated around the Jones Lake State Park in central Bladen County. The County contains four types of AWC communities: Bay Forests, Streamhead Atlantic White Cedar, Pond Pine Woodland, and Peatland Atlantic White Cedar. In most stands the types run together with transitional, indefinite boundaries.

Several good examples of mature AWC stands occur. Most of the stands occupy 4-6 acres, but they range from less than 1 acre to approximately 35 acres. In most cases, the AWC occurs in small, fairly pure, dense stands. Ages are mostly 40-60 years, although one stand was dominated by trees 20-30 years, and two others by trees 80 years or older. The quality of the stands is generally good, but most are senescing with little or no regeneration. Most of the stands have a well developed hardwood midstory. All the sites visited occur on either Pamlico muck or Lynn Haven and Torhunta soils.

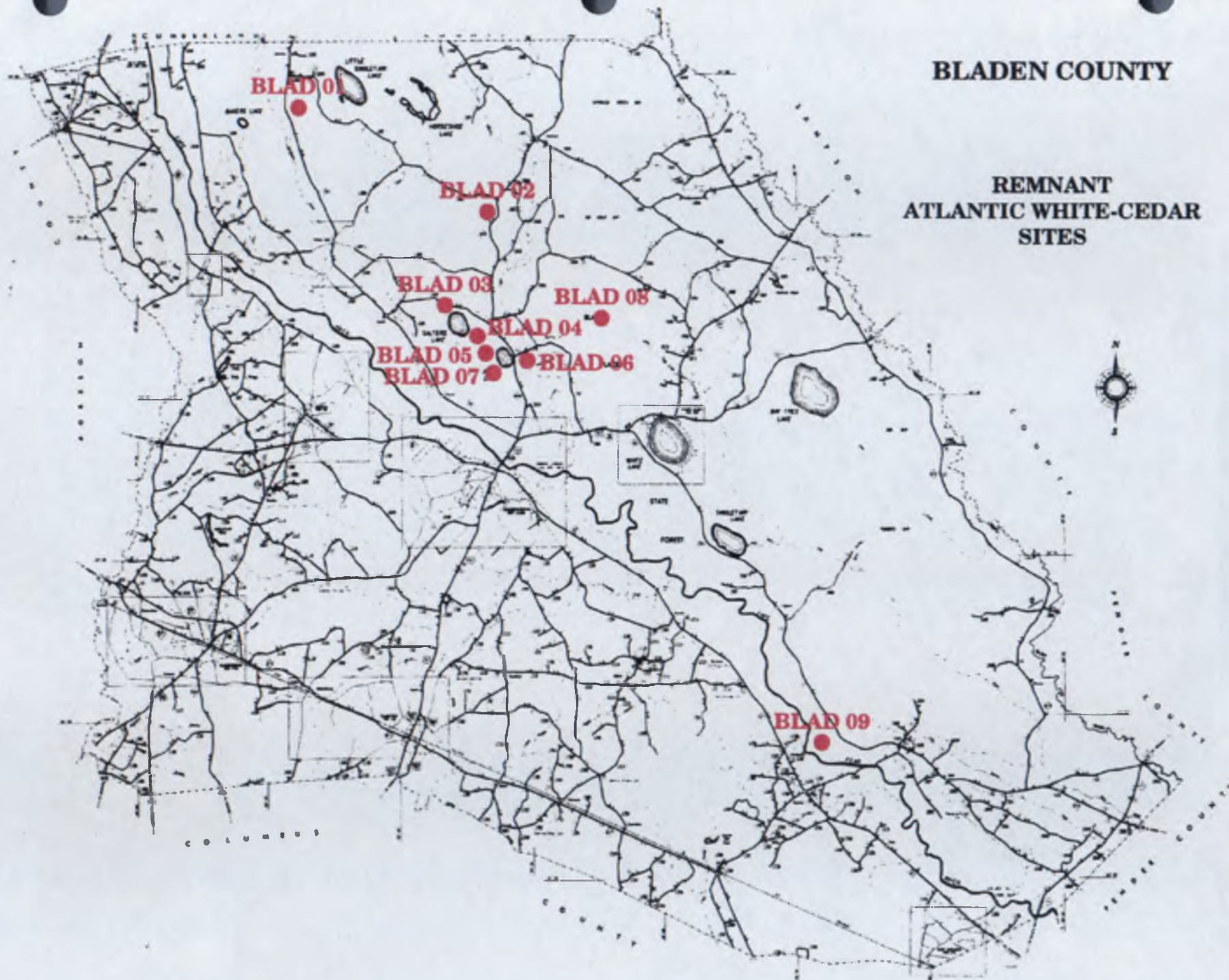
Common associates include loblolly pine, pond pine, sweet bay, red bay, and red maple. Baldcypress occurs at Jones and Salters Lakes, and willow oak occurs at the Broadwell site. The understory almost always contains fetterbush, gallberries, red maple, bays, and blasphem vine. Wax myrtle, choke cherry, sweet pepperbush, and ferns are also common.

Bladen County, like nearby Hoke and Cumberland Counties, has a significant amount of AWC on public land. Several stands occur in Jones Lake State Park, particularly around Jones Lake. All of the land immediately adjacent to the Lake and between it and Salters Lake to the northwest contains a mosaic of hardwoods, pines, and small, well defined stands of AWCs. These distinct stands vary from one another and were recorded separately for descriptive purposes.

Several sites are worth noting. Many trees on the south and west sides of Jones Lake (BLAD 07) are heavily infested with cankers and have a dense concentration of a broom-causing twig fungus. A stand on the east side of Jones Lake (BLAD 06), heavily damaged by Hurricane Fran in 1996, provides an opportunity to study natural regeneration following a natural, cataclysmic disturbance. The presence of a hardwood understory and a dense, undisturbed litter layer in BLAD 06 may hamper successful AWC re-establishment. A third site, the 35 acre Broadwell stand (BLAD 01) in the northwestern part of the County, is an excellent example of a pure, mature AWC stand. The stand does not appear to be senescing, neither is it regenerating. Parts of this stand occur on what appears to be upland. While most of the stand is fairly typical, some of the trees occur immediately adjacent to reindeer moss, a plant usually found in drier habitats.

BLADEN COUNTY

REMNANT ATLANTIC WHITE-CEDAR SITES



Key to Remnant Atlantic White-cedar Inventory Sites - BLADEN COUNTY

<u>Label Number</u>	<u>Site Name</u>
BLAD 01	Broadwell Cedar Stand
BLAD 02	Gum Springs
BLAD 03	Jones Lake SPNAs/Salters Lake NW
BLAD 04	Jones Lake SPNAs/Salters Lake SE
BLAD 05	Salters Lake Carolina Bay
BLAD 06	Jones Lake Carolina Bay
BLAD 07	Jones Lake SPNAs/Jones Lake SW
BLAD 08	Bladen Lake Forest Carolina Bays
BLAD 09	Elwell Ferry

BLADEN COUNTY

Broadwell Cedar Stand- BLAD 01

Site Size: 37 ac

AWC Size: 35 ac; 1 stand

NHP EO Code: 00665*010

Location: East of NC 53; 4.25 miles north of White Oak. Just north of Cedar Swamp Bay; 0.2 mile from NC 53. Easy access.

Description: Mature forest dominated by AWC with codominant loblolly pine, willow oak, and red maple. Understory of dense fetterbush, American holly, inkberry, red bay, titi, and Carolina jessamine. Unusually high and dry site for AWC; only location found where AWC grows near reindeer lichen. Currently cutting some AWC where mixed with pine and/or for access.

DBH (inches): AWC : 8-15; loblolly pine: 16-26

Height (feet): AWC : 50-71

Age: AWC: 80+ (cores crumbled); loblolly pine: 80+

Basal Area (square feet): AWC: 150; Stand: 180; AWC coverage: 83%

Ownership: Private

Soil:

Natural Community Type: Streamhead Atlantic White Cedar

Inspection Type: Ground and NHP files.

Gum Springs - BLAD 02

Site Size: 1 ac

AWC Size: 1 ac

NHP EO Code: none

Location: On west side of NC 242, 4 miles southwest of Ammons, 0.2 miles south of SR 1325 (Gum Springs Road); across from a house in a cutover.

Description: Carolina bay dominated by sweet bay with scattered pulp and sapling AWC. Understory of fetterbush, choke-cherry, and inkberry. Surrounding cutover formerly contained longleaf pine, now has turkey oak and water oak.

DBH (inches): AWC : 1-10

Height (feet): AWC : to 50

Age: AWC: to 40

Basal Area (square feet): AWC: 20; Stand: 100; AWC coverage: 20%

Ownership: Private

Soil:

Natural Community Type: Bay Forest

Inspection Type: Ground

Jones Lake State Park Natural Areas/Salters Lake NW - BLAD 03

Site Size: 2 ac

AWC Size: 1.5 ac

NHP EO Code: 00640*030

Location: Small bay northwest of Salters Lake in Jones Lake State Park; approx. 1 mile west of intersection of NC 242 and SR 1335. AWC visible on south side of road.

Description: Small pond pine community within a Carolina bay. Mature pond pine with scattered groves of AWC, loblolly bay, and red maple. Understory of red maple, bays, fetterbush, highbush blueberry, swamp-honeysuckle, sweet pepperbush, and lamb-kill. Herbs include various ferns and reindeer lichen. Scattered openings. Oldest AWC appear to be degenerating; many are stunted and topped; others are large in DBH but short and limby due to open grown condition. Fire scars on old stumps.

DBH (inches): AWC : 5-12

Height (feet): AWC : 30-51

Age: AWC: 40-52

Basal Area (square feet): AWC: 15; Stand: 60; AWC coverage: 25%

Ownership: Public (NCDEHNR - Jones Lake State Park)

Soil:

Natural Community Type: Pond Pine Woodland

Inspection Type: Ground and NHP files.

Jones Lake State Park Natural Areas/Salters Lake SE - BLAD 04

Site Size: unk

AWC Size: unk

NHP EO Code: 00640*009

Location: In Jones Lake State Park, along southeast side of Salters Lake.

Description: Carolina bay adjacent to lake dominated by pond pine with AWC, loblolly bay, and loblolly pine. Dense shrub layer.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: unk

Ownership: Public (NCDEHNR - Jones Lake State Park)

Soil:

Natural Community Type: Pond Pine Woodland

Inspection Type: NHP files; site not visited for this report.

Salters Lake Carolina Bay - BLAD 05

Site Size: unk

AWC Size: unk

NHP EO Code: 00640*008

Location: In Jones Lake State Park, between Salters Lake and Jones Lake Bays. Accessible from NC 242, approx. 5 miles north of Elizabethtown.

Description: Mature forest mosaic of pond pine woodland and pine flatwoods. Dominated by pond pine with codominant AWC, red maple, and gum.

DBH (inches): AWC : unk

Height (feet): AWC : unk

Age: AWC: unk

Basal Area (square feet): AWC: unk; Stand: unk; AWC coverage: unk

Ownership: Public (NCDEHNR - Jones Lake State Park)

Soil:

Natural Community Type: Pond Pine Woodland

Inspection Type: NHP files; site not visited for this report

Jones Lake Carolina Bay - BLAD 06

Site Size: 5 ac

AWC Size: 5 ac

NHP EO Code: 00650*004

Location: Along east side of Jones Lake between the lake and NC 242; near and north of SR 1511; stand 300 feet along lake.

Description: Mature forest dominated by AWC with codominant loblolly and pond pines; approx. 75% of AWC damaged by Hurricane Fran (1996). Midstory of red maple and sweet bay. Dense understory of fetterbush, blaspheme vine, inkberry, and wax myrtle. Herbs include various ferns and abundant peatmoss.

DBH (inches): AWC : 8-14

Height (feet): AWC : 50-80

Age: AWC: 50-80

Basal Area (square feet): AWC: 110; Stand: 140; AWC coverage: 78%

Ownership: Public (NCDEHNR - Jones Lake State Park)

Soil: Torhunta & Lynn Haven

Natural Community Type: Bay Forest or Peatland Atlantic White Cedar

Inspection Type: Ground and NHP files.

Jones Lake State Park Natural Areas/Jones Lake SW - BLAD 07

Site Size: 5 ac mosaic around bay.

AWC Size: 5 ac; scattered groves

NHP EO Code: 00645*005

Location: South and west of Jones Lake in Jones Lake State Park. Accessible by park trails; most within 300 feet of lake.

Description: AWC groves in a mosaic of mixed hardwoods, loblolly pine, pond pine and baldcypress. Groves are nearly pure AWC with sweet bay and red maple. Dense understory of sweet pepperbush, red bay, and blasphem vine. AWC infected with a disease that causes prolific cluster sprouting of small twigs. Areas between groves contain pond pine, baldcypress and loblolly pine.

DBH (inches): AWC : 8-19

Height (feet): AWC : 50-70

Age: AWC: 55-60

Basal Area (square feet): AWC: 140; Stand: 160; AWC coverage: 88%

Ownership: Public (NCDEHNR - Jones Lake State Park)

Soil:

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and NHP files.

Bladen Lakes Forest Carolina Bays - BLAD 08

Site Size: 20 ac

AWC Size: 1 ac

NHP EO Code: 00645*004

Location: Tatum Millpond Bay, approx. 3.5 miles northeast of Jones Lake; from NC 242, follow Sweet Home Road to Bladen School Road to Pappy Tatum Road; site marginally visible through pines.

Description: Carolina bay dominated by red maple, sweet bay and red bay with scattered AWC.

Impenetrable understory of red maple, bays, blasphem vine, and fetterbush.

DBH (inches): AWC : 6-10

Height (feet): AWC : 50-55

Age: AWC: 20-30

Basal Area (square feet): AWC: 30; Stand: 80; AWC coverage: 37%

Ownership: Public (NCDEHNR - Bladen Lakes State Forest)

Soil: Pamlico muck

Natural Community Type: Bay Forest or Peatland Atlantic White Cedar

Inspection Type: Ground and NHP files.

Elwell Ferry - BLAD 09

Site Size: 10 ac

AWC Size: 2 ac; scattered groves

NHP EO Code: 00645*001

Location: Between NC 53 and Cape Fear River, just north of Elwell Ferry Landing; approx. 4.5 miles south of Lagoon Firetower and 1 mile northwest of SR 1534 junction.

Description: Depressions densely dominated by young mature sweet bay, red maple, and loblolly pine with scattered groves of AWC. Very dense understory of red bay, sweet bay, red maple, fetterbush, inkberry, and blasphem vine. AWC ranges from 15-80% of canopy. Surrounded by cutover.

Depressions appear unmanaged.

DBH (inches): AWC : 3-12

Height (feet): AWC : 50-65

Age: AWC: most 30-40; one 100+ with pithy core

Basal Area (square feet): AWC: 20; Stand: 70-90; AWC coverage: 25%

Ownership: Private

Soil:

Natural Community Type: Peatland Atlantic White Cedar

Inspection Type: Ground and NHP files.

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APPENDIX A. Flora Included in Site Descriptions

This appendix lists the common and scientific names of plant species mentioned in the report. The taxonomy and nomenclature follow Radford and others (1968) and Schafale and Weakley (1990).

Scientific Name	Common Name
TREES	
<i>Acer rubrum</i>	Red Maple
<i>Asimina triloba</i>	Pawpaw, Common Pawpaw
<i>Chamaecyparis thyoides</i>	Atlantic White-cedar
<i>Gordonia lasianthus</i>	Loblolly Bay
<i>Ilex opaca</i>	American Holly
<i>Liquidambar styraciflua</i>	Sweetgum, Sweet Gum
<i>Liriodendron tulipifera</i>	Tuliptree, Yellow-poplar
<i>Magnolia virginiana</i>	Sweet Bay, Sweetbay
<i>Nyssa aquatica</i>	Water Tupelo, Swamp Tupelo
<i>Nyssa biflora</i>	Swamp Black Gum
<i>Oxydendrum arboreum</i>	Sourwood
<i>Persea borbonia</i>	Red Bay
<i>Persea palustris</i>	Swamp Bay, Swamp Red Bay
<i>Pinus palustris</i>	Longleaf Pine
<i>Pinus serotina</i>	Pond Pine, Pocosin Pine
<i>Pinus taeda</i>	Loblolly Pine, Old Field Pine
<i>Prunus serotina</i>	Black Cherry
<i>Quercus laevis</i>	Turkey Oak
<i>Quercus laurifolia</i>	Swamp Laurel Oak, Diamondleaf Oak
<i>Quercus lyrata</i>	Overcup Oak
<i>Quercus marilandica</i>	Blackjack Oak
<i>Quercus nigra</i>	Water Oak
<i>Quercus phellos</i>	Willow Oak
<i>Quercus rubra</i>	Red Oak
<i>Taxodium distichum</i>	Baldcypress
SHRUBS	
<i>Alnus serrulata</i>	Tag Alder, Smooth Alder
<i>Clethra alnifolia</i>	Sweet Pepperbush
<i>Cyrilla racemiflora</i>	Titi, Ti-ti
<i>Gaylussacia frondosa</i>	Dangleberry, Blue Huckleberry
<i>Gelsemium sempervirens</i>	Carolina Jessamine
<i>Ilex coriacea</i>	Sweet Gallberry, Gallberry
<i>Ilex glabra</i>	Inkberry

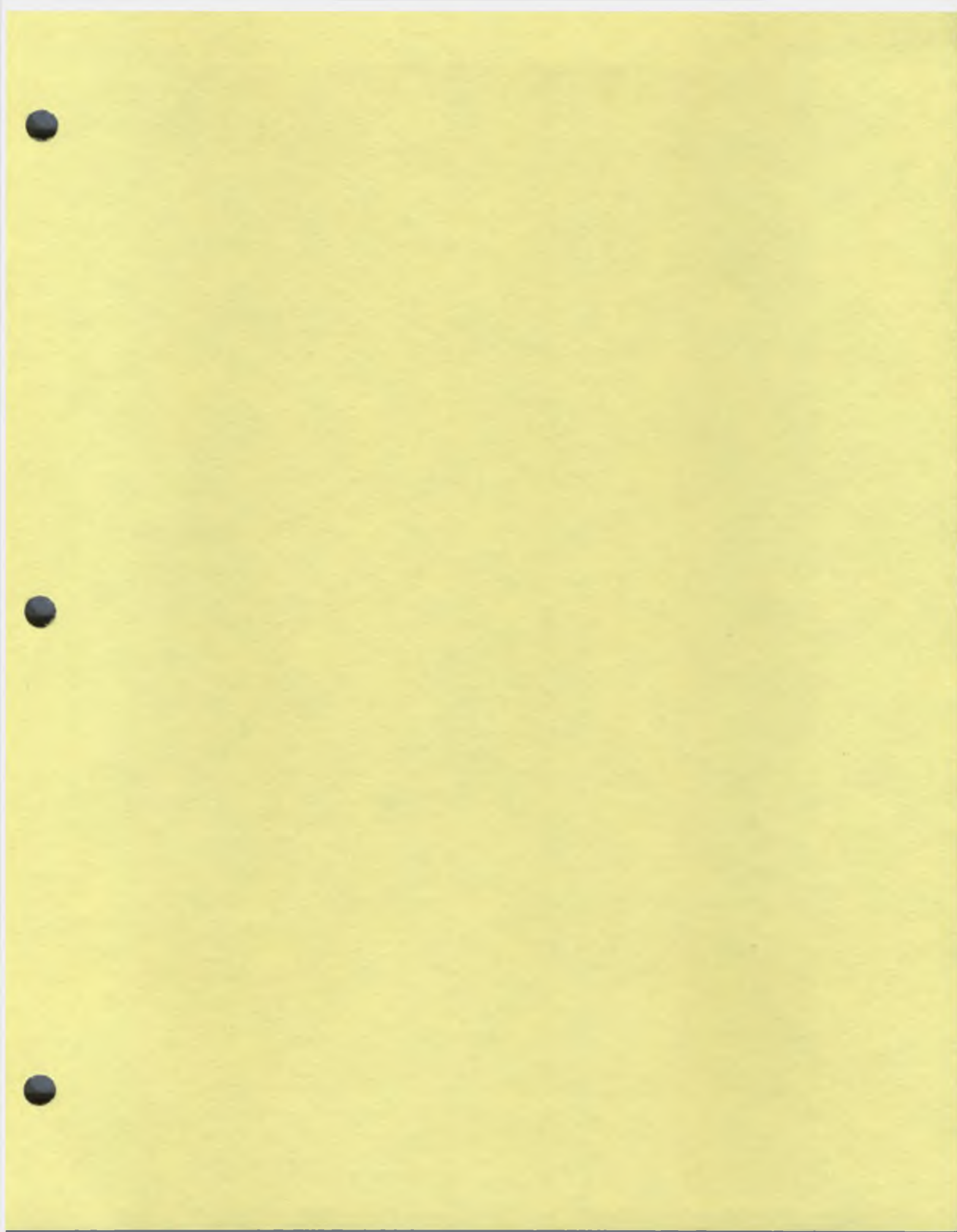
Itea virginica
Kalmia augustifolia
Kalmia latifolia
Leucothoe axillaris
Leucothoe racemosa
Ligustrum sinense
Litsea aestivalis
Lonicera japonica
Lyonia ligustrina
Lyonia lucida
Myrica cerifera
Myrica heterophylla
Parthenocissus quinquefolia
Prunus virginiana
Rhododendron viscosum
Rubus spp.
Smilax laurifolia
Smilax rotundifolia
Smilax walteri
Toxicodendron radicans
Vaccinium corymbosum & *V. fuscatum*
Vaccinium ellioti
Viburnum nudum
Vitis rotundifolia

HERBS

Arundinaria gigantea
Cladonia spp.
Mitchella repens
Osmunda regalis
Osmunda cinnamomea
Peltandra sagittifolia
Sarracenia spp.
Sphagnum spp.
Woodwardia aerolata
Woodwardia virginica

Tassel-white, Virginia Sweetspire
 Lamb-kill
 Mountain Laurel
 Coastal Doghobble
 Swamp Doghobble
 Chinese Privet
 Pondspice
 Japanese Honeysuckle
 Maleberry
 Fetterbush, Shinyleaf
 Wax Myrtle, Southern Bayberry
 Evergreen Bayberry
 Virginia Creeper
 Choke-cherry
 Swamp-honeysuckle, Swamp Azalea
 Blackberries
 Blaspheme Vine
 Common Greenbrier
 Walter's Greenbrier, Coral Greenbrier
 Poison Ivy
 Highbush Blueberries
 Mayberry
 Possumhaw
 Muscadine, Scuppernong

Cane
 Reindeer Lichens
 Partridgeberry
 Royal Fern
 Cinnamon Fern
 White-flowered Arum
 Pitcher Plants
 Peatmosses
 Netted Chain-Fern
 Virginia Chain-Fern



OCEANA (1511-126)

TASK	START DATE	DRAFT DATE	PRE-FINAL DATE	FINISH DATE	ASSIGNED PERSONNEL
Notice to Proceed	7 March 1997	NA	NA	NA	NA
Kickoff Meeting	24 March 1997	NA	NA	NA	Campo, Brown, Janek
Monthly Progress Reports	31 March 1997	NA	NA	31 May 1998	Brown, Campo
Aerial Survey: Conduct Aerial Survey of Oceana and outparcels, including Fentress.	14 March 1997	30 May 1997 1 copy	NA	30 July 1997	Photogrammetric Data Services, Brown
Forest Inventory: Describe and map all forest land and generate inventory by land class, forest type, etc.	17 April 1997	17 July 1997 2 copies	17 August 1997 2 copies	17 September 1997 5 copies	Garrison, Campo, Brown
BASH Plan: Complete BASH plan and instruction. Coordinate with Air Ops. Develop 2-sided color brochure insert for the instruction.	24 April 1997	24 July 1997 10 copies	24 August 1997 5 copies	24 September 1997 20 copies	Kelly, Merritt
Slide Show: Prepare 30-45 minute environmental awareness presentation (75 text and color slides).	1 May 1997	1 August 1997 1 copy	NA	1 September 1997 2 copies	Brown
Oceana Pond Brochure: Design tri-fold interpretive brochure of the pond.	1 June 1997	1 September 1997 1 copy	NA	1 October 1997 2000 copies	Brown, Plano GIS
Invasive Plant Survey: Conduct vegetation survey with particular attention to locating kudzu, Johnson grass, and purple loosestrife.	1 May 1997	1 November 1997 2 copies	1 December 1997 2 copies	1 January 1998 5 copies	Janek, Brown
Fish/Wildlife Coop Agreement: Consolidate existing agreements into one.	24 March 1997	24 March 1998 2 copies	NA	24 May 1998 20 copies	Brown
Mapping Effort: Field-verify data layers created for wetlands and water bodies, vegetation cover types, land use, watersheds, special interest areas, soils, installation boundaries, hunting areas, invasive plants, airfield clear zones, mission constraints, AICUZ, ESQD, IR, surface drainage, and cultural resources	24 March 1997	24 March 1998	24 April 1998	31 May 1998	Plano GIS, Brown, Campo
INRMP: Develop the plan using appropriate interview and field survey data and existing studies.	24 March 1997	24 March 1998 10 copies	24 April 1998 2 copies	24 May 1998 20 copies	Brown, Campo, Janek, SUBS

TASK	START DATE	PRE-FINAL DATE	FINISH DATE	ASSIGNED PERSONNEL
Notice to Proceed	29 September 1995	NA	NA	Campo
Kickoff Meeting	12 December 1995	NA	NA	Brown, Campo
Monthly Progress Reports	31 December 1995	NA	30 July 1998	Brown
DELIVERABLES (ORIGINAL SOW)				
Obtain 1200 Seedlings from Virginia Forestry Nursery	20 February 1996	NA	NA	Brown
Obtain 1200 Seedlings from Weyerhaeuser Nursery	16 February 1996	NA	NA	Brown
Plant Seedlings	16 February 1996	NA	24 February 1996	Brown, Ryan, Bedenbaugh, Campo
Install 12 RDS WL 40 Monitoring Wells	24 March 1996	NA	24 July 1996	Brown, Campo, Belcher
Conduct Initial Seedling Count to Determine Survival Rate	20 March 1996		20 March 1998	Brown
Submit Initial Status Report on Plantings	30 April 1996	NA	30 April 1996	Brown
Conduct 1st Annual Seedling Count to Determine Survival Rate	20 March 1997		20 March 1997	Brown
Submit 1st Annual Report to Include Computer Maps and Color Photography	30 April 1997 5 copies	NA	20 April 1997	Brown
Conduct 2nd Annual Seedling Count to Determine Survival Rate	20 March 1998		20 March 1998	Brown
Submit 2nd Annual Report to Include Computer Maps and Color Photography	20 April 1998 5 copies	NA	20 April 1998	Brown
Co-Author Scientific Paper with NTR After Third Year of Monitoring	20 April 1998	NA	30 July 1998	Brown
Submit Draft Report	June 1998 25 copies	NA	NA	Brown
Submit Final Report	30 July 1998 25 copies	NA	NA	Brown
DELIVERABLES (MODIFICATION 1)				
Notice to Proceed	27 September 1996	NA	NA	
Kickoff Meeting	30 October 1996	NA	NA	
Monthly Progress Reports	30 October 1996	NA	31 December 1999	
Obtain 2,000 Cu. Yd. SPSA Soil Amendment	30 September 1997	NA	NA	Subcontractor
Prepare Site for Soil Treatment	30 September 1997	NA	30 October 1997	LANTDIV/NAS Oceana
Incorporate Soil Amendment	31 October 1997	NA	NA	Subcontractor
Obtain 4200 Seedlings from Weyerhaeuser Nursery	24 February 1998	NA	NA	Brown
Plant Seedlings	28 February 1998	NA	NA	Brown, Campo, Bedenbaugh, Janek, Ryan, Tanguy
Submit Monitoring Report	31 October 1998	NA	NA	Brown
Submit Draft Report*	31 October 1999	NA	NA	Brown
Submit Final Report*	31 December 1999	NA	NA	Brown

*Final Report will analyze biogeophysical data collected from treatment and reference sites and will include estimates of wetland hydrology, water chemistry, organic matter content of O, A, and B substrate horizons, above- and below- ground biomass, fauna, and relative cover of colonizing plant species. Estimation of physical, biological and chemical parameters will include hydrology record from well data and climatological data; soil content analysis; relative cover and importance value calculation, complete USACOF data forms; illustrative maps; quantitative and qualitative data on fauna; comparison of data collected to similar studies; analysis of data showing relations to measured parameters; analysis of the importance of colonizing vegetation; comparative analysis of presence of Sphagnum moss to AWC growth rate; recommendations for future plantings; and analysis of silvicultural treatments relative to species performance.

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29 May
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for June
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4 June

Photographic Deliverables Schedule for Cherry Point, Oceana Dam Neck and Sugar Grove

Multiple Land Use Cherry Point INRMP 1447-126 [5438]		
Flight	15-Mar-97	22-Mar-97
1 1000 Scale Photography (Cherry Point and Weyemaeuser Acquisition)	30-May-97	7-May-97
1 Copy FAAT	30-May-97	25-Apr-97
4 Copies Photo Reference Map, Flight Lines, Alt, PPPs	30-May-97	13-May-97
4 sets 1"=1000' CIR contact prints (numbers dated on north edge)	30-May-97	7-May-97
2 sets CIR 1 1000 Diapositives*	30-May-97	7-May-97
4 Hardcopy 1"=400' scale CIR Orthomosaic	30-May-97	15-Apr-97
Sample Spot photo	30-May-97	15-Apr-97
1 set orthophotos at 1"=200' scale on CD	30-May-97	9-May-97
*One set received. PDS is retaining one set for scanning		
Multiple Land Use Cherry Point INRMP 1447-126, continued		
1"=500' Scale Photography (Atlantic, Oak Grove and Boguel)**	30-May-97	7-May-97
1 Copy FAAT	30-May-97	25-Apr-97
4 Copies Photo Reference Map, Flight Lines, Alt, PPPs	30-May-97	13-May-97
4 sets 1"=1000' CIR contact prints (numbers dated on north edge)	30-May-97	7-May-97
2 sets CIR 1 500 Diapositives*	30-May-97	7-May-97
4 Hardcopy 1"=200' scale true color spot photos	30-May-97	15-Apr-97
Sample Spot photo	30-May-97	15-Apr-97
1 set orthophotos at 1"=200' scale on CD	30-May-97	9-May-97
[Digital: Orthos on 8mm tape Microstation 95 and/or MGE format]		
**PDS got incomplete coverage of Atlantic outparcel		
This will be re-flown in 1998 when the Piney Island CIR and Cherry Point Spot photos are produced.		
Fleet Combat Dam Neck INRMP 1448-126 [5331]		
Flight	15-Mar-97	25-Feb-97
1 6000 Scale Photography	25-Apr-97	11-Apr-97
1 Copy FAAT	25-Apr-97	5-May-97
Photo Reference Map Quad Sheet, Flight Lines, Alt, PPPs	25-Apr-97	13-May-97
3 sets 1"=1000' CIR contact prints (numbers dated on north edge)	25-Apr-97	11-Apr-97
1 set 1 4800 B/W contact prints	25-Apr-97	11-Apr-97
1 set 1"=1000' CIR Diapositives	25-Apr-97	6-May-97
3 hardcopy 1"=200' CIR photomosaics	25-Apr-97	15-May-97
1 gray scale reproduction mylar of FCTCLANT photo-mosaic*	25-Apr-97	5-May-97
1 topographic map delineating flight lines	25-Apr-97	13-May-97
Digital DTM Data	25-Apr-97	21-Apr-97
1 set orthophotos at 1"=200' scale on CD		5-May-97
*The gray scale is very dark due to its CIR origination.		
LANTOIV recognizes this and will accept a dark delivery of the product, as long as the orthophoto mosaics are good quality.		
The ortho photos were returned to PDS and are being re-scanned to eliminate imperfections due to the quality of the scanning process.		
Photogrammetric Data Services, Inc.		
Malcolm MacKenzie/Jeff Snyder/Charlie Smith		
22611 Markey Court		
Suite 114		
Sterling, VA 20166-5903		
Tel: (703) 444-9751		
Fax: (703) 444-2056		
email: pdsva@cs.com		
AeroDynamics Corporation		
Carlos Ulloa - President		
4801 East Independence Blvd.		
Independence Tower, Suite 210		
Charlotte, NC 28212		
Tel: (704) 535-0212		
Fax: (704) 535-0211		

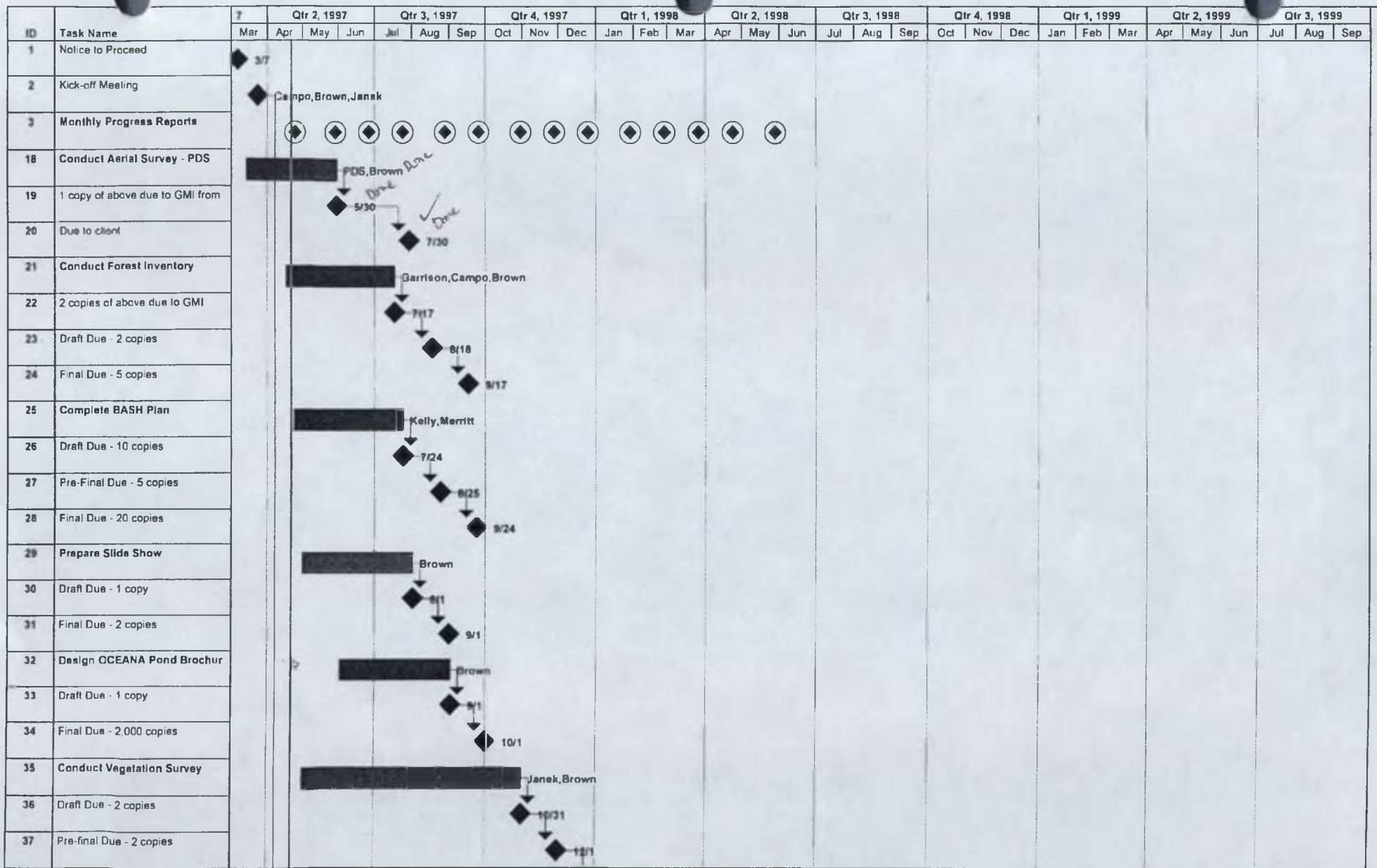
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Photographic Deliverables Schedule for Cherry Point, Oceana Dam Neck and Sugar Grove

Naval Air Station Oceana INRMP 1511-126 - 5632		Expected Date Of	Date
Aerial Photographic Survey (Pass Thru to Photo Data Services)		Completion	Received
Flight		14-Mar-97	22-Mar-97
Original Film Negatives		30-May-97	
Flight Line Index		30-May-97	
1 Set of Inspection Prints for Quality Assurance	Oceana-	30-May-97	21-Apr-97
5 Sets of 9"x9" Contact Prints	Oceana-	30-May-97	21-Apr-97
Nominal Photographic Scale 1:4800		30-May-97	
True Color		30-May-97	
50% Endlap and 30% Side Lap		30-May-97	
Spot or Area Aerial Photograph		30-May-97	
QA Sample Spot		30-May-97	
Nominal Photographic Scale 1:39600		30-May-97	
15 copies of 1:12000 Prints Mounted on Foam Board with Title Block		30-May-97	
True Color		30-May-97	
Digital Orthophotos		30-May-97	
CD-ROM (Arc-View Format) Ortho-Rectified Resolution 1:4800		30-May-97	
Sugar Grove INRMP 1500-126			
Aerial Photographic Survey (Pass Thru to Aero-Dynamics)			
Flight		30-Mar-97	27-Mar-97
1:6000 Scale Photography (CIR) of Support Area		30-Jul-97	
1 Copy FAAT		30-Jul-97	
4 Copies Photo Reference Map, Flight Lines, All PPPs		30-Jul-97	
4 sets 1"x500" CIR contact prints (numbered, dated on north edge)		30-Jul-97	
1 set CIR 1:500 Diapositives		30-Jul-97	
4 Hardcopy 1"x500" scale CIR photo enlargements		30-Jul-97	
1 set orthophotos at 1"x100" scale on CD		30-Jul-97	
1:8400 Scale Photography (CIR) of Operations Area		30-Jul-97	
1 Copy FAAT		30-Jul-97	
4 Copies Photo Reference Map, Flight Lines, All PPPs		30-Jul-97	
4 sets 1"x700" CIR contact prints (numbered, dated on north edge)		30-Jul-97	
1 set CIR 1:700 Diapositives		30-Jul-97	
4 Hardcopy 1"x500" scale CIR photo enlargements		30-Jul-97	
1 set orthophotos at 1"x150" scale on CD		30-Jul-97	
1:9600 Scale Photography (CIR) of NAVGAS Pipeline		30-Jul-97	
2 sets 1"x800" CIR contact prints (numbered, dated on north edge)		30-Jul-97	
1:8400 Scale Photography (CIR) of Operations Access Road		30-Jul-97	
2 sets 1"x700" CIR contact prints (numbered, dated on north edge)		30-Jul-97	
1:6000 Scale Photography (Natural Color) of Support, Ops. and Access Rd		30-Jul-97	
10 sets 1"x500" scale paper color enlargements from color negs		30-Jul-97	
1:24000 Scale Photography (Natural Color) of Support, Ops. and Access Rd		30-Jul-97	
10 sets 1"x2000" scale paper color enlargements from color negs		30-Jul-97	
1:4200 Scale Photography (Natural Color) of Support Area		30-Jul-97	
10 prints at 1"x350" scale		30-Jul-97	
1:6000 Scale Photography (Natural Color) of Operations Area		30-Jul-97	
10 prints at 1"x500" scale		30-Jul-97	
DTM of Support and Operations Areas		30-Jul-97	
DTM of Operations Access Road		30-Jul-97	
*Vectorization of all areas will include full planimetric detail at 1"x100" scale for the Support Area and 1"x150" for the Operations Area and Access Road			
1 Mylar and digital files in AutoCAD 11i with 2" contours will be included			

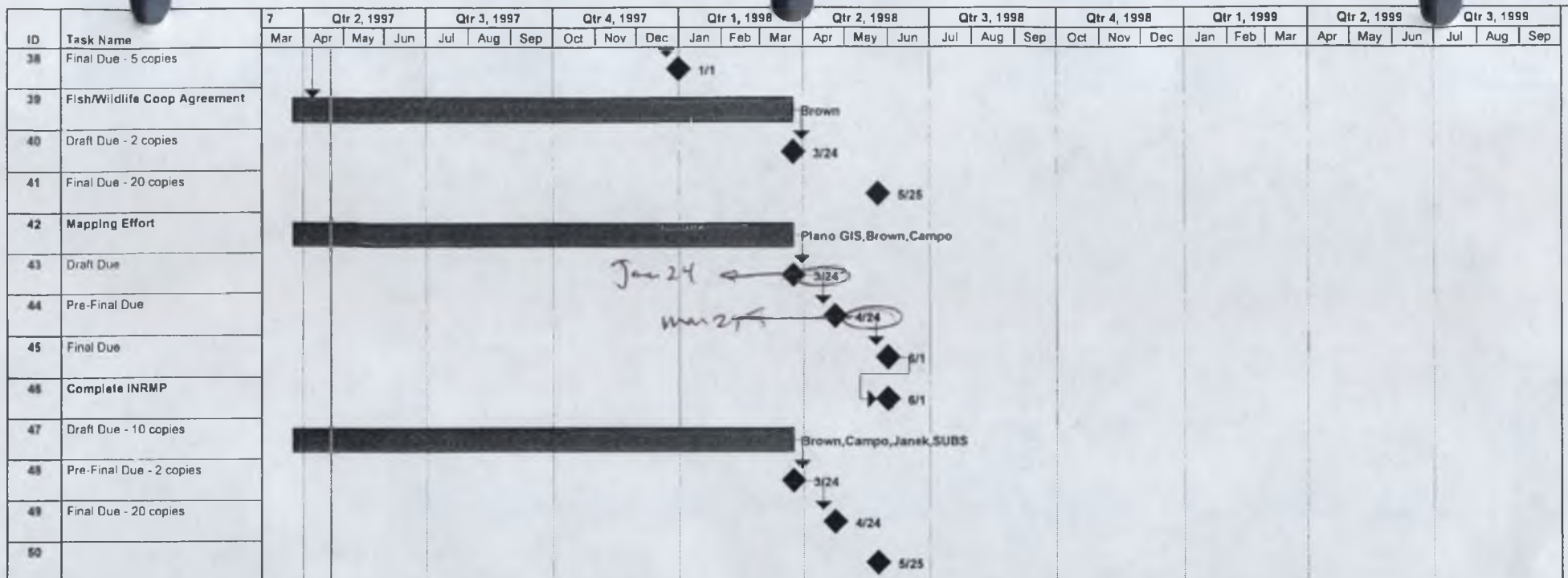
Photographic Deliverables Schedule for Cherry Point, Oceana Dam Neck and Sugar Grove

Multiple Land Use Cherry Point INRMP 1447-126 - 5435			
Flight		15-Mar-97	22-Mar-97
1:1000 Scale Photography (Cherry Point and Weyerhaeuser Acquisition)		30-May-97	
1 Copy FAAT		30-May-97	
4 Copies Photo Reference Map, Flight Lines, All PPPs		30-May-97	
4 sets 1"x1000" CIR contact prints (numbered, dated on north edge)		30-May-97	
2 sets CIR 1:1000 Diapositives		30-May-97	
4 Hardcopy 1"x400" scale true color spot photos		30-May-97	
Sample Spot photo		30-May-97	
1 set orthophotos at 1"x200" scale on CD		30-May-97	
Multiple Land Use Cherry Point INRMP 1447-126, continued			
1"x500" Scale Photography (Atlantic, Oak Grove and Bogue)		30-May-97	
1 Copy FAAT		30-May-97	
4 Copies Photo Reference Map, Flight Lines, All PPPs		30-May-97	
4 sets 1"x1000" CIR contact prints (numbered, dated on north edge)		30-May-97	
2 sets CIR 1:500 Diapositives		30-May-97	
4 Hardcopy 1"x200" scale CIR photo mosaics		30-May-97	
Sample Spot photo		30-May-97	
1 set orthophotos at 1"x200" scale on CD		30-May-97	
(Digital Orthos on 8mm tape Microstation 95 and/or MGE format)			
Fleet Combat Dam Neck INRMP 1446-126 - 5321 (Done)			
Flight		15-Mar-97	25-Feb-97
1:6000 Scale Photography		25-Apr-97	
1 Copy FAAT		25-Apr-97	
Photo Reference Map Quad Sheet, Flight Lines, All PPPs		25-Apr-97	
3 sets 1"x1000" CIR contact prints (numbered, dated on north edge)		25-Apr-97	
1 set 1:4800 B/W contact prints		25-Apr-97	
1 set 1"x1000" CIR Diapositives		25-Apr-97	
13 hardcopy 1"x200" CIR photomosaics		25-Apr-97	
1 gray scale reproduction mylar of FCPLANT photo-mosaic		25-Apr-97	
1 topographic map delineating flight lines		25-Apr-97	
Digital DTM Data		25-Apr-97	
Photogrammetric Data Services, Inc.			
Malcolm Mackenzie/Jeff Snyder/Charlie Smith			
22611 Marley Court			
Suite 114			
Sterling, VA 20166-6903			
Tel: (703) 444-9751			
Fax: (703) 444-2056			
email: pdsva@cs.com			
AeroDynamics Corporation			
Carlos Ulloa, President			
4801 East Independence Blvd			
Independence Tower, Suite 210			
Charlotte, NC 28212			
Tel: (704) 535-0212			
Fax: (704) 535-0211			



Project: OCEANA Date: 4/21/97	Task		Summary		Rolled Up Progress	
	Progress		Rolled Up Task			
	Milestone	◆	Rolled Up Milestone	◇		

Page 1



Tasks and Milestones For Development of NASO/NALF INRMP

Naval Air Station Oceana INRMP (Project 1511-126)				
Task/Milestone	Status	Date		Budget
		Completed or	Expected	
Notice to Proceed	Complete		7-Mar-97	
Kick-Off 1511-126	Complete		24-Mar-97	
Aerial Photographic Survey (Pass Thru to Photo Data Services)			*14 May 97	33,457.00
Flight	Complete		14-Mar-97	
Original Film Negatives				
Flight Line Index				
1 Set of Inspection Prints for Quality Assurance	(Oceana)		21-Apr-97	
5 Sets of 9"x11" Contact Prints	(Oceana)		21-Apr-97	
Nominal Photographic Scale 1:4800				
True Color				
60% Endlap and 30% Sidelap				
Spot or Area Aerial Photograph	(Oceana)		18-Apr-97	
Nominal Photographic Scale 1:57600				
15 copies of 1:12000 Prints Mounted on Foam Board with Title Block				
True Color				
Digital Orthophotos				
CD-ROM (Arc-View Format) Ortho-Rectified Resolution 1:4800				
Hard Copy Collateral Data				
6 USGS Topos (Princess Anne, Fentress, Pleasant Ridge, & Va. Beach)	Ordered		23 May 97	80.00
6 National Wetland Inventory Mylar Overlays of Relevant Quads	Ordered		15-Apr-97	500.00
2 USDA SCS Soil Surveys of Virginia Beach			*7 Jun 97	10,437.00
Forest Inventory				
Describe and Map All Forest Land	Kick-Off -		16-Apr-97	
Inventory All Forest Land Using FSH Land Classification System				
Mapping Efforts (GIS Plus Printing)			*7 Feb 98	
Wetlands (Compare with Geonex and NWI)				
Vegetation Cover Types (From Task 2)				
Land Use (Training, Rec., Urban, Facilities, Airfield, Ag., Etc.)				
Watersheds (Ches. Bay, South Watershed Mgt. Dist., Va. Bch. Info.)				
Special Protection and Interest Areas (Va. DCR NASO Surveys, ERA)				
Soils (Non-Digital)				
Installation Boundaries (USGS/Real Estate)				
Hunting Areas (LANTDIV)				
Invasive Plant Species (From Task 6)				
Airfield Clear Zones				
AICUZ				
Mission Constraints and Land-Use Conflicts				
ESQD				
Solid Waste/IR (Non-Digital)				
Surface Drainage Map				
Cultural Resources Sites (Goodwin, Non-Digital)				
BASH Plan			*7 Jun 97	
Travel				2,300.00
Develop Plan and Instruction				
Environmental Awareness Chapter				
BASH Brochure (2-Sided Color Page Insert)				
Bird Avoidance Models				
Slide Show				

Tasks and Milestones For Development of NASO/NALF INRMP

Naval Air Station Oceana INRMP (Project 1511-128)				
Task/Milestone	Status	Date		Budget
		Completed or	Expected	
Slide Show Preparation			*7 Jun 97	600.00
Review Available Slides				
Obtain Color Slides Where Necessary				
30-45 Minute Slide Show (75 Text and/or Color Slides With Script)				
Develop Script and Layout in Cue Card Format				
Bind Slides in Acetate Sleeves in 3-Ring Binders				
Invasive Plant Survey			*7 Sep 97	
Kudzu, Phrag, Johnson Grass, Purple Loosestrife Identification				
Map Concentrations of Invasive Species				
Provide Management Recommendations for Control and Eradication				
Oceana Pond Interpretive Brochure (Requires Windows 95)			*7 Jun 97	360.00
Develop Brochure Using Text, Graphics, and Slides (Tri-Fold, 8.5"x11")				
Describe Natural Resources and Recreational Opportunities at O P				
Review and Coordinate with Oceana NRM				
Print 2000 Copies				
Natural Resources Management Plan			*7 Feb 98	
Conduct Field Site Visits Distributed Over Seasonal Time Periods				
Develop POC Interview List (Navy, Federal, State, Local Agencies)				
Review and Use GFM				
Produce 10 Drafts, 2 Pre-Finals, 20 Final INRMPs				
Fish and Wildlife Cooperative Agreement			*7 Feb 98	
Prepare Consolidated NASO/NALF F&W Coop. Agreement				
Include in Task 8				
Incorporate and Utilize Existing Coop. support Agreement				
*Indicates Draft Stage Delivery Deadlines				